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SCIENCE AND TECHNOLOGY

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WEST EUROPE REPORT

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No. 142

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BIOTECHNOLOGY

FRG RESEARCH MINISTER CALLS GENETIC ENGINEERING KEY TECHNOLOGY

Basic Research Urged

Frankfurt/Main FRANKFURTER RUNDSCHAU in German 22 Feb 83 p 1

[Article: "To Regain Our Position, Riesenhuber Wants to Promote Basic Research Oriented Toward Application"]

[Text] Bonn, 21 February--Federal Research Minister Heinz Riesenhuber (CDU) wants to make the Federal Republic competitive again on an international scale in the field of basic research oriented toward application by promoting research centers. In his estimation, the Federal Republic has "removed itself from international discussions" in this field during the past years.

As proof for this conclusion, in an interview with Gerda Strack, the Bonn FR correspondent, Riesenhuber advanced the observation that German chemical firms are looking for laboratories in the United States and are awarding research contracts to them. But the Federal Republic has to catch up not only with the United States but also with France, England and Japan, for instance, in biotechnology.

To Riesenhuber, biotechnology is the "key technology" of future decades. It is expected to play the same important industrial role during the next hundred years that chemistry has played in industrial development during the 20th century. Among others, the minister wants to promote especially the cultivation of very hardy crops, resistant to parasites. Biotechnology will also make it possible to cultivate plants which assimilate nitrogen directly. This will make the use of chemical fertilizers, a burden on the environment, largely superfluous.

Riesenhuber Interview Report

Frankfurt/Main FRANKFURTER RUNDSCHAU in German 22 Feb 83 p 4

[Report on Interview with Federal Research Minister Heinz Riesenhuber by Gerda Strack: "Bonn Entices Bio-Scientists;" Date and Place Not Given]

> [Text] Federal Research Minister Heinz Riesenhuber (CDU) wants to entice back into the FRG scientists from the United States with attractive research positions in regional centers of gene technology. Thereby he anticipates a reduction of the need to catch up with other countries. The current regulations which guard against the dangers of biotechnological experiments will not be changed by Riesenhuber. Gerda Strack, our correspondent in Bonn, interviewed the research minister.

To Riesenhuber, biotechnology is a "key technology" in the decades to come which is expected to play as important a role during the next hundred years as did chemistry in the industrial development of the 20th century.

In the future, the minister of research wants to promote, above all, the manufacture of valuable pharmaceutical products and the cultivation of new plants. Biotechnology enables us to produce plants which are particularly hardy or resistant to parasites. Also, plants could be cultivated which, because of their ability to assimilate nitrogen directly, would make the use of chemical fertilizers, a burden on the environment, largely superfluous.

To Riesenhuber, the artificial production of insulin is a good example of the "new chances for interaction with nature" through biotechnology. The minister also wants to support the development of cell culture methods as an alternative to animal experiments. Riesenhuber has asked a group of 10 specialists from the sciences and economy to submit, by this summer, proposals for additional central trends in biotechnology and its branch, gene technology.

According to Riesenhuber's view, above all, basic research oriented toward application must be urgently promoted in order to make the FRG competitive on an international scale. During the past 3 years, the FRG "has removed itself from international discussions." German chemical firms have allegedly sought out laboratories in the United States. But, in biotechnology, the FRG needs to catch up with France, England and Japan as well.

Risenhuber hopes to overcome the backwardness of the FRG, especially in gene technology, by means of favorable working conditions for scientists. New regional "centers of gravity" for gene technology in Cologne and Heidelberg, supported by the Ministry of Research, could offer attractive workplaces even to experimental scientists who had moved to the United States during the past years. Risenhuber wants to equip a third regional center for gene technology in Munich, jointly with the Max Plank Society.

Risenhuber wants to assign to the Society of Biological Research in Braunschweig, supported by the Federal Department of Research, an "intermediary role" between basic research and applied research. The splendidly equipped institute so far has only a few contracts for collaboration with industry. The minister toys with the idea to have a gene bank established there as a service to science and industry. It could, for instance, supply microorganisms and cell cultures to laboratories.

Risenhuber does not plan either to tighten or to loosen the current guidelines protecting against the dangers of biotechnological experiments. In his view, the guidelines are "in order." They regulate the protective shielding of the laboratories for such research and prescribe the safety barriers, for instance, when handling bacteria.

In the future, human experiments are also conceivable. Therefore, Riesenhuber wants to establish the "limits of manipulation" through a debate of principles by scientists and theologians. In the minister's view, changes in the human genetic makeup are among those experiments which will definitely not be permitted.

2473
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BIOTECHNOLOGY

ELF PURSUES DIVERSIFICATION INTO BIOTECHNOLOGY

Paris L'USINE NOUVELLE in French 3 Feb 83 p 42

/Article by Bertrand Le Balc'h: "Elf Reinforces Its Presence"/

> /Text/ The creation of a GIE /Economic Interest Group/ (Monserbio) in cooperation with the dairy group, Entremont, should enable Elf to pursue diversification into biotechnology, with special focus on the agro-food market.

Elf-Aquitaine, the second largest French oil group, is entering the agro-food market. Its subsidiaries, Sanofi, Elf Bio-Industries (EBI) and Secta Yves Rocher, have just created an economic interest group, called Monserbio, in cooperation with the dairy group, Entremont, that plans to study, develop and valorize milk using biotechnological methods. At the same time, Sanofi, EBI and Yves Rocher have acquired 34 percent interest in Entremont's capital (1,750 wage-earners, turnover of 1 billion francs).

From oil to milk, the correlation is not immediately obvious. Yet, from Elf-Aquitaine's standpoint, this operation is consistent with industrial logic: along with pharmacy, chemistry, energy, agriculture and pollution treatments, the agro-food sector is one of the choice areas in biotechnology. Moreover, bioindustry is one of the areas of diversification selected by Elf-Aquitaine. As the group, under the presidency of Albin Chalandon, has been involved for a long time in energy, health, chemistry, and more recently, in seeds, it was logical that it would one day penetrate into the food sector. "Monserbio's research should lead to the development and marketing of new products involving foods and dietetics, but also pharmacy, cosmetics, flavorings and animal feed," Sanofi said.

First in line in the Monserbio operation, the young pharmaceutical subsidiary of Elf-Aquitaine is the "hard core" of the group in bioindustry. Its turnover in biological products, which has been rapidly increasing, reached 1.2 billion francs in 1981 (15 percent of its total sales volume).

Sanofi's bioindustrial activities are concerned mainly with human and animal health (antibiotics, vaccines, serums, neuropeptides, diagnostic reagents through the companies: Institut Pasteur Production, Choay, Clin-Midy and Sanofi Sante Animale.

Sanofi, which has excellent skills in genetic engineering, immunology and in the synthesis of peptides, finds in Entremont a partner that has considerable know-how in fermentation, as it is among the leading French manufacturers of emmenthal. We know that fermentations, along with enzymatic engineering and genetic engineering, are an essential component in the field of biotechnology.

Close Collaboration Between EBI and Sanofi

The relatively recent (1980) creation of Elf Bio-Industries has materialized Elf-Aquitaine's desire to create a second bioindustrial "pole" next to that of Sanofi, and independently from the other existing subsidiaries (Ceca, Rousselot). As of now, EBI's growth (sales volume of 200 million francs) is in the seeds sector, ever since Saint-Jeannet Lasserre took over the Occitane des semences [seed company] and joined the Groupement Agricole [farm association] of Essone.

However, for some time these two "poles" have been linked by a closer cooperation. Besides the Monserbio operation, Sanofi and Elf Bio-industries are now cooperating in building a large biotechnology research center at Labege, near Toulouse. It is planned to open in 1984.

In all, Elf-Aquitaine's bioindustrial activities represent a turnover of about 2 billion francs. This is little compared to its overall turnover (125 billion francs in 1982), or to the world's market of "bio" products (a current figure of about 90 billion francs that is expected to double by 1990, according to Bioconsult). All the same, this is just a starting point. In the biotechnology mobilization program, Elf-Aquitaine is still considered to be one of the two major development poles of this activity in France, the other being Rhone-Poulenc.

12204
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BIOTECHNOLOGY

CODIS TO AID THREE BIOTECHNOLOGY COMPANIES

Paris L'USINE NOUVELLE in French 10 Feb 83 p 52

[Article by Bertrand Le Balc'h: CODIS: Three New Elects"]

> [Text] With the three small companies: Clause, Claeys-Luck, Clonatec, the role of the PME's [Small and Medium-Sized Businesses] will become more significant among the biotechnology firms registered with CODIS. Curiously, the largest firms have taken a long time to react.

CODIS (Steering Committee for the Development of Strategic Industries) will support the industrial investment projects of Clause, Claeys-Luck and Clonatec, three companies engaged in biotechnology.

Specialized in cooking grains and flower seeds, Clause (16,000 wage-earners) reached a turnover of 604 million francs during the fiscal year 1981-1982, including about 10 percent for exports. The group, very dynamic on the commercial level under the presidency of Philippe Claeys, will be able to strengthen its research capacity with CODIS' aid (Claeys-Luck has just acquired a new laboratory, located in Gers).

As for Clonatec, it is a very young company, created at the initiative of a hospital research worker for making ultra-specific reagents, monoclonal anti-bodies. Its greatest originality is having known how to cooperate right from the beginning with high-level research teams with good know-how and with a desire to valorize their work. "We will begin with reagents used in the health and agro-food sectors. However, at present, we are looking for a place to set up our facilities," stated one member of the management. Clonatec, that is preparing for an increase of capital, has choice partners among its shareholders: Idianova, AEC [Atomic Energy Commission], Credit Agricole and Banexi.

The Beginnings of Sanofi, Rhone-Poulenc and Roussel-Uclaf

With Clause, Claeys-Luck and Clonatec, this brings to 13 the number of firms retained by CODIS since biotechnology was incorporated in its program. Most of these are PMI's [Small and Medium-Sized Industries] engaged in the pharmaceutical industry and in the seeds sector. Publid aid (ANVAR [National Agency

for the Valorization of Research, research fund credits, industrial policy credits, FDES loans) mobilized to their benefit amounts to 140 million francs. It corresponds to an investment program of 620 million francs over a 5-year period that should generate a turnover of 3 billion francs for biological products over the horizon to 1985.

Large groups, that took longer to react than the PMI's, have recently knocked on CODIS' door. Thus, following Roussel-Uclaf, Sanofi and Rhone-Poulenc presented their biotechnology plans last December. They are now under study. On the sectorial level, it should be mentioned that CODIS will focus its efforts on agro-food products.

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ELECTRONICS

SURVEY OF FRG ELECTRONICS INDUSTRY, NEW DIRECTIONS

Paris L'USINE NOUVELLE in French 20 Jan 83 pp 59-61

[Article by Patrick Stephan]

[Text] German electronics is coming out of its isolation. It is orienting towards international cooperation and growing dependence with respect to Japan and the United States. A strategy that makes use of massive dissemination of microelectronics and the creation of a telematics industry.

The electronics and data processing industry in FRG is at a crossroads. Sorely tried by the Japanese and the AEG court settlement, electronics is seeking a path in FRG. The present goal is two-fold: encourage massive dissemination of microelectronics and its applications in industry, and scatter assistance widely among the largest possible number of enterprises, and particulary among PME (small and medium-sized enterprises).

From 1982 to 1984, the special program stipulates expenditures of 300 million marks, and limits non-refundable subventions to 800,000 marks per enterprise in order to avoid favoritism toward large companies. One-half of the funds allocated to microelectronics (120 million marks in 1981) were invested in chip production. The government thus expects to help electronics close some of the gap with respect to its Japanese competition, a gap that is significant. While German industry is first in the traditional trades of mechanics and chemistry, it is far from having reached this position in electronics.

Have the German computer plans enabled FRG to place its manufacturers on the European or world market, and assure its technologic independence? As a whole, no. The country is of course becoming computerized in giant steps: FRG is first in Europe in terms of installed computers (26.6 percent in value), ahead of France (19.6 percent), the United Kingdom (16.6 percent), Italy, and Benelux; it is third in the world after the United States and Japan. But this large consumer of computers does not show the same performance in production, resulting in a deficit balance of trade since 1978 (801 million marks in 1981) and a modest position for its national manufacturers.

Increasingly greater dependence. Balance of trade since 1973 (billion marks)

Evolution de la balance commerciale depuis 1973 (en milliards de marks) (D)

	(A) Production allemande			(B) Exportations			(C) Importations			Consommation apparente		
	MB(*)	Inf(**)	Total	MB	Inf.	Total	MB	Inf.	Total	MB	Inf.	Total
1973	2,277	3,729	6,006	1,509	2,150	3,659	1,017	1,787	2,804	1,785	3,366	5,151
1978	2,624	5,439	8,063	1,911	2,825	4,736	1,440	3,249	4,689	2,153	5,863	8,016
1981	2,008	7,928	9,936	1,928	5,257	7,185	1,865	6,058	7,923	1,945	8,729	10,674

Source : Syndicat allemand de la bureautique et de l'informatique (affilié au VDMA).

(*) MB : machines de bureau, y compris machines à dicter, à photocopier et à microfilms.
(**) Inf. : ordinateurs et équipement informatique.

1978 est l'année du déficit de la balance commerciale en informatique (801 millions de marks en 1981). La consommation apparente s'accroît constamment de 1972 à 1981, traduisant une dépendance technologique de plus en plus grande à l'égard des concurrents américains et japonais.

Key: (A) German production
(B) Exportations
(C) Importations
(D) Apparent consumption

Source: German Union for Office Automation and Information Processing (affiliated with VDMA--Union of Machine Construction Plants)

(*) MB: office machines, including dictation, photocopy, and microfilm machines
(**) Inf.: computers and computer equipment

1978 is the year of the deficit in the information processing balance of trade (801 million marks in 1981). Apparent consumption decreases constantly from 1972 to 1981, reflecting an increasingly greater technologic dependence with respect to American and Japanese competitors.

For instance: in FRG, Siemens is only second (18.7 percent share of the market), far behind IBM (47.2 percent), while Nixdorf is sixth (2.5 percent). Without the massive support of the government, shareholders, or corporation user divisions, such companies as Kienzle, Olympia, or Triumph-Adler would have been bankrupt long ago.

The results of German firms have been strongly eroded by the price cuts IBM has made to counter the offensive of IBM-compatible computer manufacturers.

Overall, the German data processing industry shows large losses. Nixdorf's profits are consequently creating a sensation. With a turnover of 1.9 billion marks (against 2.2 billion for Siemens), Nixdorf wants to become Europe's

Leading European country in installed computers: computers installed in Europe (end 1981).

Premier pays européen pour les ordinateurs installés...

Parc d'ordinateurs installés en Europe (fin 1981)

	(A) Nombre d'installations	(B) Part de marché en quantité (%)	(C) Valeur (en millions de dollars)	(D) Part de marché en valeur (%)
Allemagne fédérale	118 953	28,3	15 609	26,6
France	74 467	17,7	11 480	19,5
Royaume-Uni	68 558	16,3	9 767	16,6
Italie	59 449	14,1	6 351	10,8
Benelux	28 947	6,9	4 754	8,1
Scandinavie	26 497	6,3	4 615	7,8
Suisse - Autriche	24 363	5,8	3 669	6,2
Espagne - Portugal	19 579	4,7	2 508	4,3
Total	**420 813**	**100**	**58 753**	**100**

Key: Federal Republic of Germany
France
United Kingdom
Italy
Benelux
Scandinavia
Switzerland-Austria
Spain-Portugal

But Siemens is far behind IBM: computers installed in FRG, by manufacturers (end 1981).

... mais Siemens loin derrière IBM

Parc d'ordinateurs par constructeur installés en RFA (fin 1981)

	Nombre d'installations	Part de marché en quantité (%)	Valeur (en millions de dollars)	Part de marché en valeur (%)
IBM	13 842	11,6	7 386	47,2
CII-HB	2 840	2,4	837	5,4
Siemens	8 293	7,0	2 930	18,7
ICL	510	0,4	133	0,9
Univac	904	0,8	548	3,5
DEC	13 887	11,7	518	3,3
Burroughs	361	0,3	97	0,6
CDC	60	0,1	190	1,2
NCR	2 192	1,8	181	1,2
Hewlett-Packard	3 130	2,6	278	1,8
Olivetti	5 600	4,7	90	0,6
Nixdorf	6 826	5,7	386	2,5
Data General	2 960	2,5	96	0,6
Sems	130	0,1	10	0,1
Autres	57 654	48,4	1 964	12,6
Total	**119 209**	**100**	**15 644**	**100**

Source : Databook

Key: (A) Number of installations
(B) Percent share of the market in quantity
(C) Value (in million dollars)
(D) Percent share of the market in value

number one supplier of banking terminals, and orients the German strategy toward greater specialization. The secret of its success is simple: limited involvement in costly production processes, unlike Kienzle, Triumph-Adler, or Olympia, and an international thrust.

Following the failure to create a European information processing pivot within EEC, the German companies are gradually emerging from their isolation to form extra-European alliances. Together with the Israeli company Elbit, Nixdorf developed the high-power 8890 computer which it now builds and distributes under its own name in FRG. Sales of the 8890, compatible with IBM's 370 and 4300, have even begun in the United States in 1981.

But the goals of the two partners do not stop there. They are planning the development of another, more powerful compatible computer, of the IBM 4341 class. More decisive yet, is Nixdorf's entry into the United States, through the 1977 acquisition of Entrex. Beginning in that year, it became one of the large American manufacturers of keyboard systems. And in 1979, at the Hanover Fair, Heinz Nixdorf hatched the idea of a compatible computer. In order to gain a foothold in the market, he bought Computer Software Company, a specialist in the distribution of IBM system software. And he also expanded the utilization areas of the 8890 by recently signing cooperation contracts with Spartacus Computers Inc.

In 1981, the American subsidiary had a turnover of 1.6 million dollars (1.1 billion francs), and sold the 620 (8850 in Europe), 8860, 8890, and 8840 systems; it contributed about 21 percent of the group's turnover. This performance was poorer than that of Triumph-Adler (United States turnover of about 2.9 billion francs, or 57 percent of the consolidated turnover), which is the leading European group specializing in office automation and data processing. It employs 4600 persons in its Adler, Royal, Royal Business Machines, and Pertec Computer Corporation subsidiaries.

But the German involvement on the American market, where it is an European pioneer, also concerns other enterprises: Mannesmann-Tally, manufacturer of computer printers; BASF Systems, which produces magnetic tapes and cassettes; AEG-Telefunken, which acquired a 25 percent participation in Modcomp (minicomputers); and Olympia.

Siemens Fully Expects To Be Out of the Red in 1983

Siemens' approach has been quite different. The Munich group devotes only a small part of its turnover to information and peripheral systems. It sells laser printers through Univac and Datagraphix, remote printers, teletex machines, and multiplexers. It is mostly in components that it cooperates with the large American companies. First of all with Intel, in integrated circuits for telecommunications; the two companies have had a cooperation agreement for microcomputers since 1976. Next with IBM, with whom it recently concluded a contract of 50-60 million dollars over five years, for 64K memories.

In the area of large computers, its unfortunate alliance with Philips and CII as part of Unidata in 1976, which determined the Honeywell action, led it to change its strategy: avoid a frontal confrontation with IBM in order to cooperate with it. In other words, Siemens was forced, like the British ICL, to distribute the IBM-compatibles of the Japanese Fujitsu. And it is indeed toward Japan that are directed the sights of the world's fifth-largest group of electrical and electronic industries, a late arrival on the information processing battlefield (5 percent of its consolidated turnover).

Its alliance with Fuji Electric goes back to 1923. It was bolstered by the creation of a joint company, Fuji Electronic Components, which in 1981 started producing electronic components. Siemens is carrying in its catalog the large computers of Fujitsu, which will be delivered during the first and second quarters of 1983. Klaus Kessler, the new head of the division, thus expects to strengthen the group's position in the IBM strategy.

The agreement with the Japanese firm does not mean an end to the production of its own machines, which started in 1950, no more than a reduction in the range of minicomputers becomes synonymous with a retreat on this market. These are clear answers to the rumors that have circulated following the restructuring and losses of 1981. Peripherals have been reassigned to the communications division, and minicomputers to electric power. In 1983, Siemens fully expects to be out of the red.

Telematics to Fly the German Pennant in the World

German information processing has two ailments: inadequate mastery of basic technologies, complicated by increased dependence on Japan; and lack of a true standing on the world market. To stop the American-Japanese advance, Siemens and Philips have reached a co-financing agreement for research and development expenses in microelectronics. These two handicaps have not cooled the enthusiasm of the corporations in seeking diversification in a rapidly growing sector. Such groups as Mannesmann (metallurgy), BASF (chemistry), Bosch (electronics), or Volkswagen (automobile) have negotiated with varying degrees of success the shift to electronics and information processing. They orient their development policies toward objectives of the future, such as telematics. Telematik Systemplanung Gmbh, created with equal shares by AEG-Telefunken, Mannesmann, and Bosch at the beginning of last year, has received approval from the Cartel Office in Berlin.

With a turnover of 5 billion marks and 45,000 employees, will the telematics association be able to fly the German pennant over the world? Or will it limit its expectations to being only a thinking group without an industrial strategy? The stakes are large, concerning as they do German information processing, its technologic maturity, and its independence.

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PROGRESS REPORT ON EFFORTS TO DEVELOP ELECTRONICS INDUSTRY

Paris ELECTRONIQUE ACTUALITES in French 28 Jan 83 pp 1, 16

[Article by J.-P. Della Mussia]

[Text] During the first meeting of the national committee of the rallying program Mastery of the Development of the Electronics Industry, on 20 January, the growth of this program since its inception last July was examined, and Mr Chevenement, minister of Research and Industry, disclosed that the R&D budget of the sector will be 8000 million francs (MF) in 1983, compared to 6300 million francs in 1982.

Also announced, was the feasibility study for a large French scientific computer, as well as the formation of a public interest group (GIP) composed of CII-HB, CNET (National Center for Telecommunications Studies), and INRIA (National Institute for Research on Data Processing and Automation) devoted to the large scale industrialization of the scientific minicomputer SM90.

According to the newspaper LE MONDE, the 1982 deficit of the French electronics sector had reached 12 billion francs with a turnover of the order of 120 billion francs, from 6 billion francs with a turnover of 96 billion francs in 1981.

But this fact is not associated with the launching of electronic industry actions.

Last July, the government had decided to launch a large four-pronged program to benefit the electronics industry: research and technologic development policy, industrial policy, utilization policy, and training. The implementation of the first two policies resulted in measures taken to increase research efforts by coordinating the activities of public laboratories, and by launching national projects designed to assure the transfer of research results to industry.

R&D: +27 Percent in 1983

In financial terms, the inducement credits allocated for the development of the electronics sector will, according to MRI (Ministry of Research and Industry), go from 6.3 billion francs in 1982, to about 8 billion in 1983. These amounts include the financing of actions conducted by DIELI (Directorate of Electronics and Data Processing Industries), and under the title of studies, by the Ministry of PTT (General Directorate for Telecommunications-DGT) and the Ministry of Defense (General Delegation for Weapons-DGA). For the interministry research allocation, credits (except for ANVAR-National Agency for Implementation of Research) have gone from 1280 MF in 1982, to 1612 MF in 1983; they include activities financed from research funds, budgets for electronics within CNRS (National Center for Scientific Research), INRIA, AEC, ADI (Data Processing Agency), as well as from part of DIELI's endowment.

In 1982, public electronics research employed 6500 people at a cost of 1700 MF (of which 1500 people/200 MF with separate salaries at CNET, AEC, INRIA, CCETT-Joint Center for Television and Telecommunications Studies, and CELAR-Center for Electronics Weapons).

At the same time, MRI estimates that 1982 industrial research costs amounted to 12,000 MF, including all military and telecommunications studies. Three agencies have provided most of the 6200 MF of the inducement credits mentioned earlier for R&D in 1982:

MRI used two budget sources: one, gathering the research fund endowments of ADI and ANVAR for 450 MF; the other, derived from the development program managed by DIELI, representing a sum of 650 MF.

The Ministry of PTT, whose DGT allocation for the electronics sector was of the order of 1800 MF in 1982.

And the Ministry of Defense, whose allocations for the electronics sector represented 3100 MF in 1982.

First Interlaboratory Collaborations

The research effort is coordinated primarily in the area of electronic components, with the following objectives: creation of a development pivot for III-V components, joining CNET, CNRS, and interested university laboratories; implementation of a joint program committee between Centre Norbert Segard and LETI (Electronics and Data Processing Laboratory) in Grenoble; and strenghtening the GRECO activity within CNRS and universities, the ARA (Advanced Automation and Robotics) activity in robotics, and LETI for display components.

In addition, Mr Chevenement stated that in the passive components area, "research teams must be reorganized to attain a critical mass."

Eight National Projects

As we know, this effort of research coordination and rational reorganization is extended to industrial enterprises, and structured within the framework of national projects.

Since July, six of the eight projects defined are being evaluated: their effective inception, given a decision from the electronics industry interministerial committee, could occur before the end of the first half of this year.

The evaluation phase of the National VLSI CAD Project began last June; the evaluation group created for this purpose includes experts and representatives from the various agencies involved in the project (DIELI, DGA, DGT, MST, CNET, ADI) and is co-chaired by Mr Nivelet (DIELI) and Mr Rault (ADI).

The first phase of the group's work was completed on 2 November of last year, with the public announcement of the project framework, which consists of three major actions:

Design and industrially manufacture a modern hardware and software architecture of CAD tools (3-5 years objective) based on the latest scientific findings;

During the next three years, expand and complete CAD systems available in industry and public research, until the products resulting from the preceding action become available;

Rapidly create for one or more of the national industries, a major service capable of producing with very short deadlines, prototype circuits for industrial or university needs, while assuring the confidentiality of these circuits.

The evaluation group has already received a large number of proposals from industrialists and research laboratories.

Display Project: Imminent Launching

The evaluation phase of the Display National Project also began last June; the evaluation group formed for this purpose consists of representatives and experts from the various interested agencies (DGA, DIELI, MST, DGT, INRIA, CNET) and is chaired by Mr Cazaubon, from DGA.

The framework project was made public last November, proposing the development of three types of products:

Large, mass produced, liquid crystal flat screens;

Second generation Videotex terminal (alpha photographic);

High definition, bit-map graphic system (work station based on the SM90, and close liaison with the conclusions of the Image Research Task Force, and thus with the Image Plan).

Based on this framework project, a number of proposals have been sent to the evaluation group by industrialists and research laboratories. A declaration to launch the national project could thus be issued in the coming weeks.

The evaluation group for the EAO (Computer Assisted Education) National Project was also created on 2 December of last year; it consists of representatives from the various agencies involved (National Education, Professional Training, MST, DIELI, DGA, DGT, ADI) and is chaired by Mrs Cazala (ADI). The group has already established many contacts with the industrial, research, and user communities: a user group has in fact been formed, combining the major users representative of the world of enterprises and of National Education. The framework project could be established about mid-February.

The Computer Assisted Translation (TAO) evaluation group was created at the end of November; it consists of representatives of agencies interested in TAO (Foreign Relations, National Education, DIELI, DGA, DGT, MIDIST-Interministerial Task Force on Scientific and Technical Information, ADI), and is chaired by Mr Oziard (ADI). The group has established a number of contacts with the scientific and industrial community, and has created a group of users combining representatives of enterprises and organizations which are large TAO users. The framework project could be established at the beginning of February.

The evaluation group for Computer Assisted Design and Manufacturing (CAD/CAM), created at the beginning of December, is composed of representatives and experts from agencies and organizations interested in this topic (DGA, DGT, DIELI, MST, ADI, CNRS, INRIA), and is chaired by Mr Lechanteux (DIELI).

The framework project was presented to the scientific, industrial, and user commission on 17 January; it proposes the creation of CAD/CAM tools and systems according to four priority topics:

Scientific and technical computation of physical objects;

Computer assisted design;

Computerized production management;

Control system for automated machines and production robots (software).

Based on this framework project, proposals are expected for 15 February.

The evaluation phase of the Software Engineering National Project began on 1 December with the creation of an evaluation group consisting of representatives of interested agencies and organizations (DGA, DGT, DIELI, MST, CNET, INRIA, ADI) and is chaired by Mr Samier (DGA).

The framework project has been presented to the scientific, industrial, and user community; it is geared around a major activity, the definition of hardware and software for a software engineering station, which could provide a basic structure for anticipated subsequent developments. This work station would include a unified hardware and architecture, allowing for maximum modularity. Priority is assigned to the development of this system based on a SOL/UNIX language.

Based on the received proposals and declarations of intent, the committee will analyze the appropriatness of immediately starting the development of a second line of equipment using artificial intelligence standards, namely the LISP language.

Two Delayed Projects

For the national project Elementary Modules for Minicomputers, Mr Chevenement has only declared that "it will provide such diverse sectors as mini- and micro-computers with the architecture and components common to the computers of the future. This project will also play a major role in defining, by the end of this decade, the computers needed by our National Defense."

The last national project is consumer electronics. On this subject, Mr Chevenement regrets that there are few laboratories to rally in this field: "Except for CCETT, TDF (Television de France), and INA, there are 25 times fewer researchers in France than in Japan. Even though our industry is a new one, this is too little. Consumer electronics research is very inadequate; it must be created. This is not only an industrial necessity, but a cultural one as well. And it is also offers opportunities to many enterprises, given the current diversification of this activity."

Lastly, Mr Chevenement declared that the Ministry of Defense together with MRI would study a future project for a large scientific and industrial computer (which would thus constitute a ninth national project, see below), and that 500 MF would be invested immediately for all the projects, of which 200 MF would be public credits on the 1983 budget. Before ending his speech to the national committee of the electronics industry, Mr Chevenement "strongly reiterated to public research organizations that the nation cannot maintain a staff of 6500 persons, which is the present number of researchers in the electronic industry's public laboratories, without expecting more from them than scientific and cultural fallout: they must cooperate with the industry and users."

Project for Large French Computer

"For its own needs, the military wants a large French computer, and it will have it. This being so, why not join this project and develop at least cost a version which could be sold, even if this computer is thus far not one of our civilian priorities?" This is not the sentence that Mr Chevenement voiced to the press, on 20 January, on the occasion of the first work session of the national committee of the electronics industry; but this is how the reporters

present at the time, interpreted his words. The minister's prudence in speaking only of a project study, is explained by the fact that the major portion of the project will not be financed by MRI, but by the military, which wants to remain as independent as possible from a possible American computer embargo. Answering a reporter's question, Mr Chevenement nevertheless stated that this was "a feasibility project that could be pursued quite far."

The study of this large computer would be entrusted to CII-HB and Sintra, but a large scale industrial production does not appear to be planned. It would be limited to supplying the French needs, which are estimated at about 30-40 machines for 1990. The development cost would be of several hundreds of million francs. The defenders of this ninth national project are stressing the fallout that such a study could provide for French electronics in general.

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FIRST FRENCH SYSTEM FOR COMPUTER-AIDED DRAFTING MARKETED

Paris COMPOSANTS in French Jul/Aug p 8

[Unsigned article: "DAO: The First French System is Born at Graphael"]

[Text] Graphael has just placed on the market the first French two-dimensional computer-aided drafting (DAO) system, the Alpha G2.

The system consists of a digitalization table for reading existing drawings, which by means of a menu allows the creation of new drawings, as well as a graphics screen display which indicates the current stage of the drawing. Added to this is a computer assembly composed of a Data General MP 100, and of a mass memory consisting of a 12.5 Mbyte Winchester drive and a 1.26 Mbyte floppy-disc reader. To operate the system, the software developed with ANVAR's (National Agency for Implementation of Research) assistance allows designers to use all the graphic functions necessary to draw plans, layouts, and so on.

The complete system, including software, sells for 260,000 francs, without taxes.

Graphael has high hopes for Alpha G2; its CAD (computer-assisted design) experience indicates that these hopes are well founded. It is interesting to note that Graphael expects to sell 70 percent of these systems to large enterprises which already have a CAD system.

This seems to be a new idea, because manufacturers only recently saw a DAO system replacing every drafting board in France, and therefore expected a large market from small enterprises. Apparently, only the large enterprises are aware of the possibilities offered by CAD and DAO, or it may be that the prices are still to high to interest PME (small and medium-sized enterprises).

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ELECTRONICS

PHILIPS, SIEMENS COOPERATIVE RESEARCH AGREEMENT

Paris ELECTRONIQUE ACTUALITES in French 14 Jan 83 p 21

[Unsigned article]

[Text] Philips and Siemens have just signed a long range collaboration agreement for research and development projects in microelectronics (see ELECTRONIQUE ACTUALITES of 17 December 1982).

By the nature of its provisions, this agreement, whose complete details have not yet been released (the two companies feel that such a disclosure would be premature), appears to be an attempt at a European response to American and Japanese research programs of the same type. The two companies are seeking to concentrate their efforts and avoid duplications in order to catch up with their western and Far East competitors in semiconductor manufacturing technologies, and consequently in component technologies.

As part of the signed agreement, Siemens and Philips will jointly form a team of 50 researchers, whose primary mandate will be to study new manufacturing technologies (or improve existing technologies), as well as CAD (computer-aided design) methods. The annual budget of the team will be $3.7 million at first. It will work exclusively on long range projects. In fact, the agreement contains no clause for cooperation on the development of short range products. In particular, any new discovery made by the joint team will be available for competitive exploitation by each of the two companies. The Philips-Siemens agreement covers research in new semiconductor materials, microelectronics, as well as some aspects of submicron technology, CAD, and speech recognition. In France, LEP (Laboratory for Applied Electronics and Physics) is expected to collaborate with Siemens on lithography and super-networks.

The two companies, which are respectively devoting 2.7 and 3.3 billion DM per year to research and development, have each already worked separately on high-resolution microlithography techniques. Until now, Siemens has focused its efforts on X-ray lithography, while Philips has more particularly investigated electron beam engraving methods. It has already obtained interesting results in this area, notably with fast electrons (see ELECTRONIQUE ACTUALITES of 5 November 1982).

In the CAD area, work should be oriented toward the development of general applications software. The topics selected by the two companies for their joint action were those that were already part of national programs for research and development assistance in the two countries (FRG and the Netherlands), as well as part of the broader program of European Community actions. In particular, some of the topics fit squarely in the European strategic program of research and information technology, ESPRIT, launched by the EEC to manage the future of microelectronics in Europe.

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ELECTRONICS

SAGEM TO PRODUCE, MARKET IMI GATE ARRAYS UNDER LICENSE

Paris ELECTRONIQUE ACTUALITES in French 21 Jan 83 pp 1, 15

[Article by JPDM]

[Text] Sagem and International Microcircuits Inc (IMI), one of the large American specialists in top of the line CMOS gate arrays, have just signed a licensing agreement according to which Sagem will be able to customize in France IMI's current and future digital CMOS arrays. This agreement also gives Sagem the exclusive responsibility for selling IMI or IMI-Sagem products in France, as well as in Belgium, Spain, and Italy. Sagem should be ready to customize single-metal layer circuits as early as mid-1983, and two-layer ones by the end of 1983.

Sagem is no stranger to microelectronics: to manufacture thin film hybrid circuits, the company's component department had already acquired CAD, testing, metallization, and engraving facilities. It also had to master micron technologies to manufacture bubble memories. It was therefore logical for the company to seek the exploitation and amortization of these resources with other applications, by customizing gate arrays as an extension of its hybrid circuit activity while meeting the demand of French semiconductor users (including some of Sagem's own departments) for a local service for this type of product.

The selection of IMI is thus easily explained: it has the reputation of offering top of the line CMOS gate arrays, and while its services are rather expensive, they are satisfactory. The range of offered arrays consists of more than 30 models. (The company has already customized 600 circuits since its creation in 1974; it introduced its first silicon-gate circuits in 1979, and its first two metal-layer circuits in 1981. IMI fabricates everything itself, starting with blank silicon slices; its annual turnover is $10 million).

Sagem is actually very familiar with this company, having used its services since 1980.

The agreement announced today is thus a logical consequence of this collaboration. As we have stated, Sagem will be in a position to customize its circuits for the free market, starting with IMI gate arrays, beginning in mid-1983 for single metal-layer circuits, and by the end of 1983 for two metal-layer circuits. These dates correspond to the time needed to install manufacturing lines which will be exact replicas of those at IMI.

The agreement leaves Sagem free both to sign a similar agreement with another gate array company offering complementary products (bipolars or pre-characterized devices, for instance), and to subsequently acquire non-customized array slices from other suppliers than IMI.

The facilities for circuit design, simulation, and verification are already in place at Sagem (built around a VAX and an Applicon system, with IMI and Sagem cell libraries) at the Argenteuil plant. The fabrication will be carried out at the Eragny plant, where all the microelectronics installations already exist.

For the European Market

The agreement reached with IMI stipulates that Sagem will have exclusive rights for selling circuits manufactured by IMI or Sagem in France, Belgium, Spain, and Italy, but the French company will also be able to sell these circuits in all other countries. It will customize all of IMI's CMOS circuits--except for linear circuits--that is, circuits which integrate 70 to 7000 two-input gate-equivalents with gate delays as low as 3 ns.
A 10,000-gate model should be announced soon.

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ELECTRONICS R&D PROJECTS, STUDY FOR SUPERCOMPUTER ANNOUNCED

Paris AFP SCIENCES in French 27 Jan 83 pp 1-4

[Unsigned article: "Mr Chevenement Announces the Beginning of Preliminary Studies for a French Supercomputer Project"]

[Text] Paris--On 20 January, during the first workshop of the national committee of the rallying program Mastery of the Development of the Electronics Industry (see AFP-SCIENCES No 320, 29 July 1982, pp 1-3), Jean-Pierre Chevenement, minister of research and industry, announced the launching of feasibility studies for a "large scientific and industrial computer" project.

Among specialists it is well known that the construction of a supercomputer, whose project will be studied jointly by the Ministry of Research and Industry (MRI) and the Ministry of Defense, has periodically stirred the interest of French scientific and military circles for the past five years.

France, as most other countries in fact, does not produce any very large computers, which it must import from the United States. The French market is of several units per year at most, a reason for which the study and industrialization of such machines are not justified in themselves.

But following the dispute between Europe and the United States about the Eurosiberian gas pipeline, the American authorities have dragged their feet on an agreement to deliver two Gray One computers for French scientific research. We might remember that in 1964, the American government had already embargoed a Control Data unit which was to have simulated French nuclear bomb experiments; this decision led General de Gaulle to launch the first computer plan.

The eventual decision to build a French supercomputer for military and scientific purposes will depend on the results of the preliminary study announced by Mr Chevenement. Among interested parties, the total studies are estimated at about 300 MF (million francs). The same source indicates that the actual fabrication would amount to several million francs per unit.

Priorities of the French Electronics Industry

At the same meeting, Mr Chevenement indicated that allocations for R&D in electronics and information technology, which were 6.2 billion francs in 1982, would be increased to nearly 8 billion this year. For the national projects whose study has been approved, the minister added, about 500 MF will be invested immediately, of which 200 MF in public credits, and this effort will be assisted in keeping with the progress of these projects.

Eight projects, Mr Chevenement continued, are currently being prepared:

a) In components, where the requirement for independence is fundamental, efforts must first of all be devoted to a mastery of mask definition, especially for the more complex integrated circuits. That is the objective of the national project Computer Assisted Design of Very Large Scale Integration Circuits.

Also to be mastered are the key components for future consumer applications. That is the role of the Displays national project. In aid of these two major developments, we must combine research forces, as well as avoid as much as possible duplications and unnecessary competition in a scientific field in which "our position is fragile and the stakes are fundamental." CNET (National Center for Telecommunications Studies) and LETI (Electronics and Information Technology Laboratory) must cooperate on the future of MOS technologies; CNRS (National Center for Scientific Research), universities, and CNET, must work on gallium arsenide; and research teams must be combined to achieve a critical mass in the area of passive components.

This program has taken its final shape with the formation of two major pivots: Thomson and Matra, as well as Radiotechnique (Philips subsidiary), which retains a non-negligible role.

Eurotechnique, one of the principal French component manufacturers, had been the subject of long negotiations about its future, because its situation was rather complicated: it is a 51 percent subsidiary of the nationalized group Saint-Gobain, whose information technology activities were cancelled, and 49 percent subsidiary of the American company National Semiconductor (NSC).

The protocol announced by the minister of research and industry stresses the future development of a cooperation between Thomson and NSC on Eurotechnique's present products, and an expansion into other areas. This takeover was paid a symbolic franc to the American company, since Eurotechnique, created in 1979, was not yet earning a profit.

On the other hand, several million dollars have been turned over for a recent renewal of licenses, according to sources close to NSC.

With Matra, Thomson will find itself heading a vast potential in components: EFCIS (Study and Fabrication of Special Integrated Circuits), which performs this activity in the group, employs 14,000 persons and has achieved a turnover of 3.3 billion francs in 1981, with components aimed at professional and consumer needs.

Eurotechnique employs 465 persons in its ultra-modern facilities at Rousset near Aix-en-Provence, whose output is higher than that of NSC.

"This cooperation was difficult, but we now have our two champions, who have the means for reaching a critical mass against international competition," Mr Chevenement estimates.

b) Five national projects are launched in information technology. Three of them involve strategic disciplines for the future development of the French industry: the Software Engineering project, which will make it possible to significantly increase productivity in program writing; the Computer Assisted Design and Manufacturing (CAD/CAM) project, which determines the modernization of our industrial information processing and thus the improvement of productivity in our manufacturing industries; and the Minicomputer Elementary Modules project, which will directly support developments in the information technology industry. It will supply all the sectors of mini and micro data processing with an architecture and components common to the computers of the future. This project will also play a major role in defining by the end of this decade, the computers necessary for French national defense.

In the same spirit, the Ministry of Defense and MRI will jointly study the future Large Scientific and Industrial Computer project. This computer, essentially intended for the army's communications and similar to the American Cry One [in text], will also have to be applicable to civilian industrial and scientific needs, but the market will remain relatively small: about 40 units between now and 1990.

Lastly, two national projects are devoted to new and important information technology applications: Computer Assisted Education, and Computer Assisted Translation.

These actions, the minister indicated, will have to be complemented by a reorganization of public research: INRIA (National Institute for Research on Data Processing and Automation), which plays a large role in France's information technology research, will become even more active in the design of new equipment, and in the implementation of national projects. The other laboratories, notably those of CNRS and universities, will continue the recombinations already underway, and organize other ones.

c) Lastly, a national project will be devoted entirely to Consumer Electronics. It will be complemented by the results obtained in the Display project, and those of the Image Research task force (Messrs Stourtze and False). Unfortunately, "there are few laboratories to rally" in this case, Mr Chevenement declared. There are 25 times fewer researchers in France than in Japan in this field. Research in consumer electronics must be "largely created."

d) Other actions must be conducted in sectors in which, Mr Chevenement emphasized, France's position is already strong. National projects will assist the ambitious equipment already installed by the Ministry of PTT,

notably in Wide Band Networks. The same applies to professional electronics, with the support of the Ministry of Defense. Efforts must be continued in scientific, technical, and medical instrumentation, where "so many possibilities are offered to small dynamic enterprises."

Finally, with the rallying program covering all of research, a smooth interface must be assured with fundamental research.

And Mr Chevenement concluded, "the nation cannot maintain 6500 employees, the current number of researchers in the public laboratories of the electronics industry, without expecting something more than a cultural and scientific fallout. They must cooperate with industrialists and users."

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ELECTRONICS

FRENCH LABORATORIES RESEARCH GALLIUM ARSENIDE DEVICES

Paris L'USINE NOUVELLE in French Jan 83 pp 8-9

[Article by Claude Amalric and Jean Roume]

[Excerpts] Super-fast switching: the Josephson circuit, a superconductor immersed in liquid helium. Another material does it without artifice: gallium arsenide. In fact it can do almost everything. But we barely know how to use it for integrated circuits. Only a few laboratories, among which Thomson's LCR, have obtained significant results.

Recently, the Japanese semiconductor and information technology manufacturers--who often are one and the same--have received a great deal of publicity. Battered by the IBM sting, the prestige of their technology had to be urgently restored. When Hitachi (the first party in the "case") will unveil next year its S-810 supercomputer, capable of performing 630 million operations per second, it will issue more than a challenge: the timing is much too hasty.

And what are we to think of the four megabits of memory that NEC claims it will be able to integrate "within five or six years," when technology has just barely succeeded in mastering the fabrication of 64,000 bit memories, which are 62 times less dense? Not to be left behind, Toshiba promises among other things, to integrate 2400 transistors in a gallium arsenide (GaAs) circuit within a few years, and proclaims it very loudly.

Computation speed, integration, GaAs technology: the Japanese know where to strike. Of these three announcements, and of many others that are currently being made, it is the latter that appears to be the most modest. And yet, it is one of the most important, because GaAs is henceforth recognized as one of the most promising technologies of the near future, despite the difficulties that remain to be overcome for its success. Consequently, all of the world's large laboratories are feverishly working on it.

French Research in Good Standing

Given all these advantages, it is appropriate to ask about the position of French research. The answer is that it is in good standing: practically all the national electronics centers are studying GaAs. At the Thomson-CSF LCR (Central Research Laboratory) for instance, a group of 50 researchers out of the 300 at that location, are successfully working on gallium compounds. The record of 18 picoseconds per gate, obtained in 1982, appears to be still standing, with a consumption of 0.9 mW. "We have been dealing with this material since 1974," explains Gerard Nuzillat, in charge of the department. "Even though GaAs is lagging 15 years behind silicon, we can see that it is making very rapid progress. Until 1980, the integration density has multiplied by three every year." With the Japanese firm Fujitsu, LCR meets the performance claimed by Toshiba. "We have a divider operating at 5.7 gigahertz, the preliminary step toward a 'wafer microprocessor' which will accept a 250 MHz clock. Next year, we will integrate the 3500 elements of a 256 bit memory accessible in 0.9 nanoseconds. If the prospects are realized, we hope to build a 1024-bit memory in the next year." This means 12000 elements grouped in several hundred gates: the cutting edge of progress.

This should assure a brilliant future for GaAs, although at times not as brilliant as claimed. According to scientific estimates and market studies, the share of GaAs in 1990 should not exceed about 15 percent of the integrated circuit market. In any case, it would not replace silicon, which in exchange, it complements very well.

That is because the development of gallium-based technologies is hindered by many limitations. Let us first eliminate the one which appears to be mistakenly proclaimed: the material's rarity. Given the near certainty of not being used for mass-produced batteries, gallium will certainly satisfy technologies that are unimaginable at this point, since the known reserves will suffice for several centuries. More serious are the difficulties of obtaining a crystal of large dimensions without surface defects after polishing. "We are working with two-inch diameter slices; these will soon reach three inches, but then they will remain this size for a long time. But the industry currently uses equipment to process silicon slices of four and even five inches in diameter. It is therefore rather deceptive to stress the analogy between silicon and GaAs processing: the machines are not compatible."

This comment from Max Verdone, scientific leader at Leti (Electronics and Data Processing Laboratory), defines the limits of the comparison and becomes a clear indication of the lag in GaAs. "But based on my experience, I believe strongly in the resources of physics and the imagination of researchers," he adds. This will become useful in reducing the very high cost of the fabricated material, increasing the area of slices, and improving the knowledge and fabrication of super-networks, structures that are very complex for mass production, but which rapidly bring out the best in GaAs. Several months ago, a Hitachi subsidiary claimed to be able to produce large quantities of GaAs squares, 45 mm on one side, of excellent quality and suitable for manufacturing lasers and super-networks, thus superseding a barely preceding announcement by Sumimoto Chemical, world leader in volume.

In France, where Rhone-Poulenc holds a good position in the economical extraction of gallium, all the rather disjointed research on GaAs will henceforth be coordinated by the Ministry of Research and Industry, whether carried out at Cnet (National Center for Telecommunications Studies), CNRS (National Center for Scientific Research), or in universities.

Everything is ready for very high performance French products to be manufactured and marketeted in time.

Gallium, Rare and.... Abundant Metal

According to specialists, the electronic applications of GaAs represent by far the largest market for gallium between 1985 and 1995.

Traditionally, gallium is produced in 4N and 6N quality by units with a capacity of several tons per year, operating in conjunction with plants that transform bauxite into aluminum.

In the fall of 1981, a Rhone-Poulenc-PUK joint company started in Salindres (Gard), a gallium unit of 7 tons per year, using a liquid-liquid extraction process on Bayer liquor.

In one year, this process proved to be competitive since it uses little energy and is non-polluting, unlike the the two processes (carbonation and mercury cells) used so far elsewhere. The development expectations for GaAs are already raising the problem of a two-fold increase.

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ELECTRONICS

THOMSON ASSUMES FULL CONTROL OF EUROTECHNIQUE

Chevenement Announces Takeover

Paris ZERO UN INFORMATIQUE HEBDO in French 24 Jan 83 p 1

[Article by JP]

[Text] Last Thursday, while chairing the first meeting of the national committee of the rallying program Mastery and Development of the Electronics Industry, Jean-Pierre Chevenement announced "the completion of agreements allowing the integratation of Eurotechnique within the Thomson group." The latter begins by acquiring the shares of National Semiconductor (49 percent) for a symbolic franc, and then those of Saint-Gobain (51 percent), who thus definitely leaves the electronic field.

And so, as planned, the French semiconductor industry is reduced to two centers: Thomson and Matra.

A new "components plan" will be announced in the near future, whose goal will be to achieve equilibrium in the French balance of trade within five years. The financial effort in research, development, and industrial investments will amount to 6 billion francs in four years.

The minister also mentioned research and development efforts. In financial terms, the "inducement credits" have gone from 6300 million francs in 1982, to 8000 million in 1983. In terms of "coordination and standardization," the effort is "extended to enterprises and structured within the framework of national projects."

Other Compensations for NS

Paris ELECTRONIQUE ACTUALITES in French 28 Jan 83 p 13

[Article by JPDM]

[Text] Despite the fact that Eurotechnique (manufacturer of integrated circuits formerly 49 percent National Semiconductor and 51 percent Saint-Gobain) has been acquired from NS by Thomson-CSF for a symbolic franc (see ELECTRONIQUE ACTUALITES of 21 January 1983), this company declares itself relatively satisfied with the transaction as far as the interests of NS are concerned (it deplores however, that "the government has made a poor choice for French interests in general").

Indeed, NS points out that the company accepted to sell its shares for a symbolic franc at the request of the government, but that it received monetary compensations (several million dollars) for renewing its licenses to Eurotechnique, and in another non-disclosed form.

It also acknowledges that it received sufficient guarantees from the government regarding the applications acceptance of its present and future products by various government agencies, guarantees which it considers very valuable for the use of its products in France.

Trade Value of About 70 Million Francs

In fact, we are in a position to reveal that NS had to renounce a portion of its compensation which we estimate at about $15 million, in order to obtain these guarantees, a sum which under the circumstances appears to be a duty paid for not being subjected to the consequences of our "protectionism."

Eurotechnique's turnover and losses for 1982 are not public for the time being, because its results are first consolidated with those of Saint-Gobain. However, we estimate that the turnover has been of the order of 70 million francs; the official losses are in any case not significant, since they depend on the manner in which the company's accounts were calculated. (They are probably of several tens of million francs, and not of hundreds of millions, as announced by a daily newspaper). Moreover, Eurotechnique was still in an introductory phase, and profits were not expected before another two years. Under these conditions, why blame it for its losses? Especially since the market is poor and since given the doubts about its future, the company had not received any long term orders for more than six months.

A Eurotechnique Communique

After the announcement of its acquisition by Thomson-CSF, the management of Eurotechnique asked that the following text be published:

"Created about three years ago with a production that started in 1981, Eurotechnique rapidly asserted itself as the European leader in standard mass produced products (sixth largest EPROM producer in the world according to Dataquest). We also should point out that its performance was achieved without the support of a large French electronics group, and that its very rapidly acquired technology allowed it to avoid the purchase of foreign products. The obverse of this success, praised by all, including DIELI (Directorate of Electronics and Data Processing Industry), the largest customers of French and foreign information processing sectors, telecommunications, and the French and German automobile market, has caused it to suffer losses (certainly not hundreds of million francs) which can be considered small in the light of the company's level of industrial production."

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FRENCH PRESS REPORTS ON VISIT TO SIEMENS RESEARCH LABS

Paris COMPOSANTS in French Jul/Aug 82 pp 5-6

[Unsigned article: "Siemens: Nearly 10 Percent of Turnover in Research"]

[Text] In order to respond to recent criticism that assigned the company's success in the past few years to good management rather than creativity, Siemens in May opened its research laboratories of Munich and Erlangen (FRG) to the French press. Indeed, there were those who suggested that the policy of the world's fifth largest electrical industry company has often been characterized by cooperation agreements in many fields, such as microelectronics with AMD and Intel, among other American companies, information technology with Fujitsu (until 1981), office automation with Xerox, robotics with Fujitsu-Fanuc, and so on.

However, a visit of the ultra-modern research facilities at Munich and Erlangen, clearly shows that innovation is increasingly the key of Siemens' strategy. This is confirmed by a few significant figures.

Of Siemens' worldwide turnover (more than 3 billion DM), 9.6 percent is already allocated to research and development, making it the third largest in the world in terms of percentage, among the leaders of electrical and electronic manufacturing: behind Western Electric (11 percent) and Sperry Rand (10.2 percent), but ahead of ITT (8.1 percent), Philips (7.5 percent), AEG, Westinghouse, General Electric, and IBM. At Siemens, these R&D activities employ more than 30,000 persons throughout the world, which has made it possible to increase the turnover contribution of products less than five years old from 42 percent to 49 percent between 1972 and 1981. At Munich and Erlangen, the major portion of the research effort is concentrated on superconductivity, nuclear magnetic resonance, plasma physics, fuel cells, microelectronics, and optical fiber transmission.

The use of superconducting excitation windings in large turbogenerators makes it possible to significantly increase their capabilities and output. In the laboratory, Siemens is studying a superconducting generator with a power of 2000 MVA, which would be built by KWU, a Siemens subsidiary which is the world's third largest builder of power plants; a demonstration rotor using superconductivity should be shown in 1984.

As a radiology process now reaching maturity, but studied for some ten years, nuclear magnetic resonance provides medical diagnosis with an enormous advantage over conventional radiology: it makes it possible to detect the nature of human tissues without irradiation. Siemens is getting ready to soon market such a system.

One of the most spectacular phenomena to be seen in the Siemens laboratories is the stroboscopic, sweep electron microspcope display of waves propagating at about 4000 m/s on the surface of piezoelectric crystals such as quartz and lithium niobate. The image shows perturbations resulting from material defects, reflection, or diffraction outside of the normal wave. These acoustic waves can also be used for bandpass filters, delay lines, and so on.

The process, requiring a sweep electron microscope, also makes it possible to test components by displaying voltage differences of 1 mV over 1 micron, with response times of 1 ns.

The objectives of microelectronics research are to reduce dimensions so as to reach the VHSIC (very high speed integrated circuit) stage after VLSI's (very large scale integration). By 1985, Siemens expects to achieve 40 sq-mm VLSI chips (from the current 35 sq-mm) with minimum geometries of 1 micron obtained on silicon wafers of 150 mm in diameter (from the current 100 mm).

In optical fiber transmission, Siemens is conducting research at three wavelengths (850, 1300, and 1600 nm), and is developing star couplers, buses, and multiplexers/demultiplexers. For instance, a two-channel multiplexer makes it possible to simultaneously transmit two signals at two different wavelengths on the same optical fiber. The first tests were completed with a signal separation of 70 nm; in the case of two channels with two multiplexers, the total insertion loss was 4 dB with a maximum attenuation of 30 dB between the two channels for single direction transmission; in a bidirectional mode, the best result obtained was 60 dB. In its laboratories, Siemens is also developing an optical fiber interferometer for navigation systems, which should evolve toward better resolution, precision, and dynamic operation, as well as toward miniaturization through the use of directional couplers or integrated optics.

These few examples disclose a small portion of the topics being examined at the Siemens research laboratories. It would be impossible to write an exhaustive report for a company which produces semiconductors as well as large electrical machinery, or simple relays and complex process controls, in other words, the entire gamut of electrical and electronic manufacturing, from a wall plug to nuclear power plants.

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CSO: 3698/214

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BRIEFS

COMPUTER-RESEARCH LABORATORY ESTABLISHED—Finland has acquired a special computer-technology laboratory. It has been in operation since the beginning of this year in Oulu as part of the information-technology research program at the State Technical Research Center (VTT). "There is a need for a special unit like this so that we may be capable of properly responding to the growing demand for research and development services," said Samuli Saukkonen, the director of the computer-technology laboratory. The computer-technology laboratory got its personnel and its first project "as transfers" from the VTT electronics laboratory, which also operates in Oulu. The new research unit's field of operations covers the entire ranges of small and microcomputer equipment, systems and supplies as well as those of production techniques. "We offer services relating to our field of operations to industry throughout the country," Saukkonen said. They predict that the strong demand and the need for research in this field will require the rapid growth of the laboratory. "Thus our present 20-man unit will probably increase to one with a staff of 30 by as early as the end of the year," Saukkonen believes. The VTT's sales volume for computer-technology research last year was over 6 million markkas. The chief goal of this research is to advance the industry's ability to compete. [Text] [Helsinki [illegible] in Finnish 4 Mar 83 p 7] 11466

[illegible]

UK ROBOTICS: STATUS, GOVERNMENT AID PLANNED

Frankfurt Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT in German
9 Mar 83 p 5

[Article: "British Government Will Support Robot Building"]

[Text] J. Rh. London, March 8. "Automate or liquidate--" someone found this odd slogan some time ago and brought it to public attention. In recent times this battle cry has not pertained so much to the automating of entire assembly lines and large chemical process facilities as it has to the application of robots. In this field, British industry has not exactly been in the vanguard. Among the industrial countries they are about half way up and a long way behind the leaders: At the end of last year, 13,000 robots were in use in Japan; 6,250 in the United States; 3,500 in the FRG; 1,300 in Sweden and 1,152 in England. Further down are France with 950, Italy with 700 and Belgium with 350. Other Western countries together employ 1,200 of these agile helpers. In this regard, one must remember that the Japanese use a broad definition of the word "robot."

It is true that England had an increase of 61 percent in the number of installed robots last year, but that amounted to only 439 units. In the FRG, 1,200 new installations were made; in the United States, about 1,500 and in Japan, 3,000. With regard to the number of old installations and the ones added last year, England is both absolutely and relatively--on a per capita basis--behind the FRG and way behind Japan.

One does not have to search far to find the causes for England's plight. It is the general relative regression of the British economy, marked by low investment over a number of years. The endless intervention of governmental bureaus in the economy under previous regimes, which again and again injected new cycles of stop-and-go policy, made industry wary of investing in research and development as well as in machines and facilities. The inhibition in both areas means that the robot concept was impeded in a twofold sense in England.

In the British Ministry of Industry it is hoped that this will now change and that last year's 60-percent growth rate will be repeated this year from a significantly higher starting point. With growing use of robots, continuous advertising of their merits and substantial government funds for motivating

inhibited businesses, prospects have improved for a somewhat more spirited activity in installing robots. The necessity of lowering personnel costs is often not the only or not even the real reason for installing robots. Health dangers of a certain work process, higher material consumption or better quality of product can just as well be the reason. For such reasons, two robots were installed several years ago for spraying large kitchen range parts in factory of TI Creda Limited, a subsidiary of Tube Investments PLC. Previously the parts had been stamped. In this process, a considerable quantity of the expensive glass enamel was trapped in recessions and accumulated on projects, resulting in a loss of the expensive glass enamel. It is reported that this material loss problem has been solved, the enamel coating is much more uniform, the number of defective parts has been halved, and that the workers have been relieved of a physically taxing job. The three men who previously did this job are still involved in the process, but are engaged in other tasks.

In 1979 the two robots from Hall Automation cost about 36,000 pounds and the conveyor about 8,000 pounds. No saving was made in personnel costs, but the added capital cost was made up by material savings. And a higher quality product was produced. Today of course the same robot with its movable shoulder, elbow and wrist would cost 50,000 pounds or almost DM 200,000: that is, about 3 times as much. But on the other hand, material is no longer as cheap as it was then.

Many jobs will have to be taken over by robots because they are physically taxing or dangerous. Stacking sacks on a pallette is a hard job for humans; a robot can lift the sacks with a suction gripper. When spraying the bottom of automobiles, a worker has to wear protective clothing. Continuously refeshing the air in a spraying cell costs a lot of energy. Repairing the insides of a nuclear reactor is dangerous work. Wiring automatic machines is very tiring activity. British Leyland, the nationalized auto producer, has developed a "sniffing robot" whose task is to find leaks in automobile chassis without using water. The robot sniffs at the likely places and its computer marks the location of leaks on plan-view and side-view drawings.

Of the 1,150 robots now installed in England, about 35 percent are employed in welding, 15 percent with injection molding, just under 11 percent with painting, just under 10 percent with attending machine tools, and the remainder are involved with other tasks such as grinding, assembling, die casting, attending presses, stacking, inspection and forging. Few objections to using robots are heard from the unions. Frequently, robots do not eliminate jobs, but instead secure them. Cases are known wherein companies, for example a supplier for the automobile industry, had to turn to robots to keep from losing a large part of their business in the face of stringent demands on quality and reliability.

Further technical development is, among other things, directed at enabling robots to recognize and classify various anomalous situations, for example, when feeding parts, to neglect parts smaller than a specified size. For accomplishing such tasks, they are more and more frequently being equipped with sensors.

As for sales, last year the 10 British manufacturers of robots did not top a sales figure of 10 million pounds in producing 150 to 170 robots and providing tools and installation. The largest of these is the American-based Unimation (Europe) Ltd. in Telford/Shropshire which has increased its production to nearly 150 robots per year. The most important purely British firm is Hall Automation, a subsidiary of General Electric. Several companies have agreements with Japanese companies under which they sell or produce Japanese robots with the intention of one day developing from these a line of their own products.

For the government, all of this is not happening fast enough. Thus it has promulgated a program with funds for application studies, investment aid and grants for companies which would like to develop and produce robots. The responsibile state secretary labels the program "a great opportunity." However, experience from other fields and similar circumstances says there is no better support than a strong upswing in business with active demand for investment goods.

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CSO: 3698 248

SCIENCE POLICY

FRENCH ASSESS RECENT R & D EFFORTS AS GENERALLY SUCCESSFUL

Paris AFP SCIENCES in French 17 Feb 83 pp 1-5

[Text] Sophia-Antipolis, 1 year after the national research and technology colloquium. The approximately 300 officials and people involved in research gave a "generally positive" assessment to the administration's policy on research and technology at the "Sophia-Antipolis meetings," held on 14 and 15 February at the scientific campus of Valbonne, near Nice.

Actually, based on the listing cited at the meetings of the legislative actions taken over the past year (the orientation and programming law, reform of major research organizations, the establishment of new structures for the MRI [Ministry of Research and Industry], etc.), the strong upturn in R & D budgets, and projects now being carried out, the record seems quite impressive.

The minister of research and industry, Jean-Pierre Chevenement, presented a striking picture of the work now underway (details are given later in this article). Some of his colleagues who are entrusted with major missions at the ministry, including Roland Morin, director general of scientific and technological research, Robert Chabbal, head of the science and technology mission, and Roger Lesgards, wholeheartedly agreed.

Mr Chabbal reported that the mission he heads is working on the preparation of a scientific and technical masterplan, which will be a flexible plan covering a 4-year period. It will include an inventory of all the nation's scientific and technical resources, and will also serve as a tool to stimulate dialogue between all the partners involved.

This masterplan will provide a basis for preparing budgets for research and development.

But in terms of the regions, while there is a growing realization of the decisive role which research and development must play in the nation's life (an illustration of this is the creation of research associations of all sorts, acting in liaison with the ADEMAST [National Association for the Development and Mastery of Science and Technology]), the practical and concrete spinoffs of this national research policy are still only few in number. This became quite apparent when the regional representatives spoke.

The time factor certainly has something to do with this. As a representative from the Languedoc-Roussillon area said, "a year isn't long enough to produce any major changes in behavior."

Moreover, even if new ideas have been included in legal texts--but certainly not all the new ideas, and this is true particularly for scientific and technological advisory services--transformations which require money to be put into practice have not kept pace with the principles established. And the economic crisis isn't making things any easier.

The total of the regional research budgets for research and development did greatly increase during the last 3 years (74 million francs in 1980, 147 million in 1981, and 218 million francs in 1982). But these figures are still well below the real needs of the regions in this field.

The Sophia-Antipolis meetings revealed the extreme diversity of the situation in France, based on specific examples. Some regions have not yet managed to grasp fully the extent of the scientific and technical potential they do possess and the way it could be put to use, while others, such as the Rhone-Alpes area, have been involved in research and development on a large scale for years.

Research-university relations gave rise to intense or even heated debates. Bernard Descomps, director of research at the ministry of national education, pointed to the gap between the potential and the objectives of higher education institutions. This potential is truly enormous, since there are 43,000 teachers/scientists and 20,000 research technicians working in 5,000 laboratories. This potential equals the potential of all the public research organizations in France.

During the opening sessions Francois Gros, adviser to the prime minister for scientific issues and president of the ADEMAST, asked that the report on the year which has just elapsed since the national colloquium be given without excessive indulgence,

but also without an overly critical spirit. "Neither arrogance nor gloom," he added. The Sophia-Antipolis meetings were conducted in the atmosphere he called for.

Mr Chevenement's Speech at the Colloquium

In his lengthy speech at the colloquium's closing sessions, Jean-Pierre Chevenement, the minister of research and industry, after pointing out that the "Sophia-Antipolis meetings were not held to rekindle a flame," but rather to "modestly prepare a first report, to study the first lessons, to enrich our actions by comparing our first experiments, to make sure that the rudder and sails are well on course, and if necessary, to make the maneuvers required to speed up the pace," did in fact present a broad panoramic description of the work in progress on the reorganization of French research, the results that have been achieved, and the problems now arising.

First of all, programming and budgets.

The first estimates, which are still provisional in nature, show that "in 1982 we achieved a level slightly above 2.10 percent. We are climbing the steep slope leading to our objective of 2.5 percent of the PIB [Gross Domestic Product] for our DNRD [National Spending on Research and Development]. We started from 1.8 percent in 1980. Now in the middle of the period, we are exactly at midstream of our course."

This growth has been made possible through the strong increase in the civilian research budget.

"The effort will be continued in 1983." The growth planned for the civilian budget is 17.8 percent, based on an average percentage stipulated by the law. "It s likely that this percentage will be slightly reduced because of budget cutbacks, whose extent has not yet been determined."

The minister indicated that he had obtained the prime minister's agreement that "a special procedure and preferential treatment" will be granted to research. "We are going to clarify this over the next few weeks. This means that the figures mentioned by some newspapers in recent days do not correspond to reality."

The minister requested that spending on international commitments, program support, and support for mobilizing programs be maintained, in any event. These sectors should be spared from budget cutbacks.

Jobs. With the percentage of 4.5 percent for job creation, nearly 5,000 new jobs were created in 1981 and 1982. Another 2,500 will be created in 1983. (It was reported elsewhere that in 1983 the job creation rate will be 4.3 percent).

Organizational reform. This reform "has become a reality." The EPA [Autonomous Public Facilities?] such as the CNRS [National Center for Scientific Research], the INSERM [National Institute of Health and Medical Research], the INRA [French Institute for Agronomical Research], the ORSTOM [Overseas Scientific and Technical Research Office], along with some others, will be changed into EPST [Scientific and Technical Public Facilities] within the next few weeks, as soon as the CSRT [Research and Technology Council], which is to issue an opinion on this matter, has held its first meeting.

This meeting is scheduled for 3 March. An entire day will probably be needed for the first session. The minister plans to submit to the council a number of important reports and he expects to receive enlightened and informative opinions and advice from this "little research parliament."

On the subject of personnel regulations, the minister indicated that "their preparation was well advanced." An interministerial cooperation program has been set up, and four working groups, dealing with retirement conditions, evaluation procedures for ITA [expansion unknown], training, and mobility, have brought together government officials and union representatives to work on the major issues. This sort of cooperation will be expanded to the entire program and will continue throughout March. "Our goal," said the minister, "is to produce a definitive text by the end of the first quarter of this year."

Training by research and for research "has also seen some new developments." In 1982 100 complementary research allocations were established. The MIDIST [Interministerial Mission on Scientific and Technical Information] has developed a complementary allocation to enable students to improve their documentation and information. The CIFRE [expansion unknown] fellowships have been increased from 50 to 156 (these are industrial contracts for training by means of research programs).

The GIP [Public Interest Groups]. There are 60 projects for public interest groups now being considered. Industry is involved in 50 percent of these cases. A decree will be issued

within the next few weeks to give these GIP a definitive financial status as flexible as possible under French law. A circular will accompany this decree, stating the way these GIP will be used.

Regional developments. According to the minister "the regions must be the source of initiative, proposals, new ideas, original designs, but it is essential that their activities develop consistently with national policy."

The regions must set priorities, and establish carefully the regional technical poles specified by law, based on their specific functions and resources.

The "relative scarcity of regional financial resources requires that a careful evaluation be made of their projects and proposals."

The minister announced "the preparation, under the 9th plan, of 'state-region' contracts." "Based on the recommendations made by the prime minister, the minister of research and industry, acting in liaison with the ministry of planning and territorial development, will inform the regional commissioners of the priority objectives of the research and technological development policy. These objectives will be set in terms of programs (such as mobilizing programs and applied and finalized reseach programs)."

For some of them, a regionalized translation will be undertaken. This will be done, for instance, in the areas of biotechnologies, electronics, production methods, materials, food processing, etc.

At the same time, the regions will prepare their first reports. As soon as the regional advisory committees for research and technology are in place (the decree should be issued at any time now) and have received the regional proposals, the content of these proposals may be examined by the region and the MRI.

The MRI and the DATER [Delegation in Charge of National Development and Regional Action?] will organize a working session in a few days in order to determine the working relations between the MRI and the regions.

Technical research centers. The minister wants to give them a new life, new missions, so that they will truly become collective research centers, which the PME [Small and Medium Business Enterprises] greatly need. That is why he will soon begin consultations on these centers with all the interested parties,

such as professional organizations, union groups, and research laboratories. The objective of these consultations "will be to begin their reform, which is to be included in the bill on France's industrial development now being prepared by the MRI, as part of the national plan for industry."

What sort of spirit is guiding the reform of these technical centers? A clearer definition of their missions. These centers, in addition to research, should be able to conduct activities such as training, technical assistance, standardization, technical control, and technological dissemination. They should become more oriented toward the outside.

On the subject of their resources, which now come from parafiscal revenue, the minister believes "that it is abnormal for technical research to be financed solely by national production and not at all by the sector which deals in sales or imports."

In conclusion, the minister said that "the stage is now set." "The actors have rehearsed their roles. The ship has left the port, and it is solidly built. Its crew is experienced. Now it must face the high seas and reach its cruising speed, realizing that we will not be always sailing on smooth seas. The world we live in now is being shaken by strong tempests. To emerge from today's crisis we must invent a new model for development."

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CSO: 3698/233

SCIENCE POLICY

NATIONAL ASSEMBLIES TO DETERMINE INDUSTRIAL POLICY

Paris AFP SCIENCES in French 3 Feb 83 p 5

[Unsigned article: "Coordination Committee of the National Assembly for Industry"]

[Text] Two industrialists, Jean Riboud, president of Schlumberger, and Pierre Eelsen, general representative of Renault, will chair the Coordination Committee of the National Assembly for Industry, which will be held on 27, 28, and 29 June 1983 in Paris.

The commitee will head the 12 workshops which will consider the following four topics: win the industrial battle on an international scale, work together, break down partitions in industry and its environment, and create a competitive industry. One-half of these workshops will be chaired by industrialists.

At the same time, the national assembly will be preceded by 10 preliminary events which will examine in greater depth and expand the discussions opened in October 1982 at the workshops organized in Paris. The first of these events will be held on 14 and 15 February at Sofia Antipolis, on the topic Research and Industry.

Other decentralized meetings will be organized in all regions on the role of PMI (small and medium-sized industries) in regional development.

Finally, workshops involving management and personnel will be conducted at several plants of nationalized enterprises.

A publicity drive aimed at changing the French public's image of industry will also be carried out.

It should be pointed out that these concerted actions will result in a legislation draft for France's industrial development, integrated in the second plan law presented to Parliament next fall.

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SCIENCE POLICY

CENTER FOR STUDY OF ADVANCED SYSTEMS, TECHNOLOGIES TAKES SHAPE

Paris AFP SCIENCES in French 24 Feb 83 pp 1-2

[Text] Paris. The CESTA [Center for the Study of Advanced Systems and Technologies] is now taking shape. The decree listing its missions and structures was published in the JOURNAL OFFICIEL on 23 February. The CESTA, created as a result of an interministerial decision of 18 January 1982, has been gradually set up. It is operating in the former buildings of the Polytechnical School at the Montagne Sainte-Genevieve. It is being run by an interim delegation headed by Jacques Robin.

The CESTA has been given a legal status as flexible as possible. It is an EPIC [Industrial and Commercial Public Facility], and it is under the supervision of the minister of research. Its purpose will be to "contribute to the understanding of innovation, particularly the relations between developments in sciences, technology, and society."

The CESTA's missions will include:

a. To increase the knowledge of complex systems, the evaluation and dissemination of advanced technologies.

b. To study the impact of new technologies on traditional industries and services.

c. To evaluate the economic, social, and cultural repercussions of technology on the lives of individuals, organizations, and societies.

For these purposes, the center has the responsibility to:

1. Conduct or encourage studies and research in order to form a source of documentation and make available to interested parties an international documentation system.

2. Help organizations, communities, and businesses, and any interested ministerial departments with their planning, evaluations, technological decisions, and with their strategy for innovation.

3. Organize activities to promote awareness and training, aimed primarily at industrialists, union members, scientists, and government officials.

4. Organize meetings or activities and provide technical support for qualified associations in the area of the advancement of science and technology.

The center may form associations by contract with other French or foreign centers.

In terms of its structures, the CESTA will be directed by a board of directors, headed by a chairman assisted by a director general. Pierre Chavance, the P-DG [Chief Executive Officer] of CIT-Alcatel, was appointed chairman on 23 February.

The center will also have a scientific, technical, and cultural collegial body. The head of this body will probably be Francois Gros, adviser to the prime minister for scientific issues.

The provisional structures of the CESTA include:

a. management and administrative organizations:

1.	delegate general	Jacques Robin
2.	mission director	Michel Demazure
3.	secretary general	Martine Berge

b. two operational poles:

1. The IPSPT [Scientific and Technological Planning Institute]. Its director is Yves Stourdze.

2. The GEACT [Technological Choices Study and Assistance Group]. Its director is Francois de Lavergne.

c. operational services. These include: study services, budget-programming, conferences, foreign relations.

The CESTA will provide significant support for the ADEMAST [National Association for the Development and Mastery of Science and Technology]. In addition to providing office facilities and

personnel, the CESTA will also help ADEMAST with its technical expertise. The ADEMAST will help the CESTA to maintain close ties with the most vital elements in scientific and technical development and with the users of these developments.

Biography of Mr Chavance

Pierre Chavance, chairman of the CESTA's board of directors, was born on 19 April at Laignes (Cote d'Or department). He studied at the Polytechnical School and at the National Superior Institute. From 1948 to 1954 Mr Chavance was a research engineer at the CNET [National Telecommunications Research Center], then he was director of the telecommunications department at the French Thomson-Houston Company, from 1955 to 1970.

From 1970 to 1972 he served as Thomson-CSF's general technical director. He then joined the CGE [General Electric Company], where he served in turn as deputy director general of Alstnom, from 1974 to 1976, and as director of development, from 1976 to 1982. Since 1979, he has also been deputy director general of the CGE. On 16 June 1982 he was appointed administrator-director general of CIT-Alcatel and chairman of Alcatel Electronics.

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CSO: 3698/235

SCIENCE POLICY

ITALIAN NATIONAL RESEARCH COUNCIL ACTIVITIES DISCUSSED

Rome NOTIZIARIO DELL'ENEA in Italian Sep-Oct 82 pp 34-39

[Article: "CNR Role From Research To Innovation"]

[Excerpts] "In Italy, the most important diversified public scientific network, alongside that of the universities, consists of the Institutes and Centers of the CNR [National Research Council], which, in the historical evolution of Italian scientific and technological research, has played a central role that it must not and cannot be permitted to lose. This role has been that of a fundamental element in technological innovation, and hence one of the most important factors in productiveness and economic and social growth."

This is a significant passage from--because it synthesizes the "spirit" of--the "General Report On the Status of Scientific and Technological Research in Italy for 1982" submitted on 30 September by CNR's president, Prof Ernesto Quagliariello, to the Plenary Assembly of CNR Committees before forwarding it to the CIPE [Interministerial Committee for Economic Planning]. The CIPE must enunciate its own views regarding the general policy lines contained in the report, and must take them into account in arriving at its decisions on the problems and program recommendations set forth in the report.

Among the legislative and financial provisions that could impart a real forward thrust to the research and innovational programs, the CNR report cites recent Law 46 titled "Support Measures for Sectors of the Economy of National Scope," the refinancing of the IMI [Italian Credit Institute] Special Fund for Applied Research (1,700 billion lire for the 1982-1983 biennium), and the institution of the Ministry of Industry's Special Revolving Fund for Technological Innovation, with a funding of 1,500 billion lire for the 1981-1983 triennium. The CIPE has designated five industrial sectors to receive these fundings: Automotive and components, electronics, fine chemicals, aeronautics, and steelmaking. Appropriations totaling 3,000 billion lire over a 5-year period are planned for the implementation of the National Energy Research Plan, which coordinates the activities of the CNR, ENEA [National Committee for Research and Development of Nuclear and Alternative Energies], ENEL [National Electric Power Agency], ENI [National Hydrocarbons Agency], and INFN [National Institute for Nuclear Physics]. Another 1,000 billion

lire, over the same 5-year period, are to be allocated to the National Space Plan, which the CIPE entrusted to the CNR on 25 March last year. Further funding is being allocated to the farming sector and by the Institutive Law on the National Public Health Service.

In its meeting of 27 May 1982, the CIPE authorized the CNR to proceed with the drawing up of seven projects grouped within the fields of Economics, Agriculture, Advanced Technologies, and Human Health. These projects, for which, for the first time, "research contracts" were brought into being as the new instrument provided by Law 46 for the financing of applied research, address in particular: Structure and evolution of the Italian economy, increased productivity of agricultural resources, genetic engineering and molecular bases of genetic diseases, preventive and rehabilitative medicine, control of diseases of infective origin, biomedical and sanitary technologies, and mechanical technologies. The new projects, particularly the one relative to the Italian economy and "Energetics 2," position the CNR as Italy's international interlocutor on the major issues of unemployment and energy, the central problems of the international community over the next 10 years.

Resources for Research in Italy

The real increase in expenditures for research during the period 1967-1980 (at 1970 prices) was, taken as a whole, 70.5 percent, with an average annual increase of 7.3 percent until 1972, and of 3.6 percent from 1972 to 1980. The increase in 1981, for which year the CNR report was able to cite only the expenditure forecast figures, should amount to around 26 percent over 1980. This increase is attributable mainly to the University, the CNEN (now ENEA) and the CNR. The ratio of R & D _research and development_ expenditures to GDP _gross domestic product_ from 1967 to 1980 was 0.9 percent, while for 1981, owing to zero growth of the GDP versus an increased commitment to research, this ratio should be around 1.08 percent. Referring still to the period 1967-1980, the increase in R & D expenditures was substantial, on the part of both the government and the enterprises, with increments of 43 percent and 99 percent respectively. As for financing, the government covered, on average, 48.2 percent of the total, and the enterprises 50 percent. The public sector, therefore, finances also a part of the research done by the enterprises, which have received funds in growing amounts over the years. From a modest quota of 1.7 percent of all public financing in 1967, the enterprises gradually came to receive an 8.5-percent share in 1980, which is indicative of the continually growing interest being shown by the state in industrial research. For the period under examination, financing from foreign sources, oscillating around 1.5 percent, must also be added in.

For 1982, R & D expenditures by the government and enterprises should amount to 3,363 billion lire, with an increase of 22.6 percent in monetary terms over 1981 (allowing headroom of 17 percent for inflation). A further breakdown shows an increase of 27.1 percent in appropriations in the case of partly-state-owned enterprises, and 19.2 percent in that of the private enterprises. The enterprises are planning to commit larger financial resources than in 1981, to which must be added the public financing of industrial

research through the IMI Fund. In the public sector, the Ministry of Public Instruction accounts for the largest share of the expenditures with allocations amounting to 29.1 percent, followed by the ENEA with 26.8 percent, and the Fund for Southern Italy with 9.4 percent. The Defense Ministry and the CNR, on the other hand, have experienced a sharp drop in their appropriations. In the case of the CNR, it is the state's regular contribution that has been reduced. In the sectoral breakdown by disciplines, only the physical sciences and nuclear research activity have been subjected to reduced funding. Funds for biological and medical research, the agrarian sciences, and engineering and technological research, on the other hand, have been increased.

Professor Quagliariello's report provides a detailed analysis of scientific personnel staffing in 1982. The national institutions employ a total of 87,589 persons: Specifically, researchers number 41,716, of which 23,191 are employed in the public sector, 6,194 in ENEL and the partly-state-owned enterprises, and 12,331 in the private sector. The increase in the public sector's personnel, over 1981, is owing mainly to the expansion in university-trained personnel and only minimally to a more suitable distribution of the personnel of the Higher Institute of Health and Sanitation and of the Defense Ministry. The CNR's researchers number 2,101.

In conclusion, the CNR document sets forth the CNR expenditures projection for 1982, pointing out how the the reduced state contribution, less than 40 billion lire, "has had a marked impact on the promotion of research. In fact, financial interventions by the CNR Committees in support of research show a drop in monetary resources of 5.5 percent from the levels of the preceding year." To the first-generation End-Use Projects still in progress, because they were begun after those that were completed in 1981, will be added the seven approved by the CIPE last May, for which 5-year funding requirements have been projected at 282,204 million lire. In 1981, public funding for national space programs totaled 38 billion lire, while that for international programs came to 70 billion lire. The updated National Space Plan this year calls for projected expenditures of 513 billion lire for the period 1982-1986, with a subsequent increase of 108 billion lire beyond 1986, for an overall total of 660 billion lire.

9399
CSO: 3698/224

RENAULT'S RESEARCH AUTOMOBILES DESCRIBED

Eve: Sleek, Efficient

Duesseldorf VDI NACHRICHTEN in German 5 Nov 82 p 27

[Article by Olaf von Fersen: "Eve Makes Optimum Use of Fuel without Shifting--The Car of Tomorrow: Research Renault Has No-shift Power Transmission"]

[Text] The "Eve" research car of Regie Renault came about upon proposal of and with assistance from the Energy Ministry. The full name concealed by the abbreviation is "Elements pour une voiture econome" [Elements for an Economical Vehicle] and shows that the project involves improvements in various fields which specifically are to be useful and suitable for series production. Eve roughly has the size of the Renault 18 series-produced model and is a roomy, four-door, middle-category limousine with adequate trunk space. The project has two definite main points: Reduction f air resistance and improvement in engine efficiency.

The possibilities of reducing the empty weight were used in the Renault Eve research passenger car only to the extent that they can be implemented in the foreseeable future also through series production. To be sure, light-weight metal and synthetic materials were increasingly used as raw materials, along with glass of reduced thickness, but only to the extent to which the costs had to remain practically within the spread of series-production calculations. Through the increased use of light-weight metal, it would have been possible to save more than 50 kg in weight in the engine alone. But since the project did not include this kind of increase, an engine available in the production program was used for Eve; this is a modified 1,108 cm^3 four-cylinder engine with grey-casting cylinder block and a capacity of 39 kW, such as it is used in the model program of the "5" series put out by the company. Very little was changed in the engine itself and that was quite deliberate in order first of all to investigate the effect of the reduction of air and rolling resistances as well as the function and efficiency of the new type of power transmission.

The research vehicle is a little bit bigger than the Renault 18 and also has more inside space. A comparison of the individual dimensions shows that, with the series-produced model figures being given in parentheses: Wheel base

2,509 mm (2,441 mm); gauges 1,415 mm/1,368 mm (1,415 mm/1,355 mm); length 4,408 mm (4,381 mm); width 1,740 mm (1,689 mm); on the other hand Eve is 75 kg lighter with a weight of 845 kg (920 kg). Work on the more streamlined body began with the development of a considerable number of designs of which several were checked out as 1:5 models in the wind tunnel. The best shape was then converted to a sacle of 1:1 for further optimization. In making the selection, by the way, it was not just the aerodynamic qualities that were decisive; the available useful space, the visibility conditions, and pure esthetic aspects also played equivalent roles.

Although the body's profile surface turned out to be 4 percent bigger than in the series-produced model the extraordinarily good c_W value of 0.239 (0.39) on the whole resulted in a considerable reduction in the overall air resistance amounting to almost 37 percent.

The power concept starts with the idea of running the engine as much as possible steadily in the range of its best efficiency. This almost naturally presupposes no-shift power transmission. Renault engineers selected the Van Doorne "Transmatic" where a thrust [shift] member belt made of metal runs between conical disc pairs. The change in the interval between the double discs allows the belt to run over a variable radius. This gear guarantees a very wide transmission or reduction range and makes it possible to run the engine at higher driving speeds with greatly reduced rpm. Engine rpm, choke valve position, and gear reduction are controlled automatically by means of a microprocessor. The driver's foot pedal here is no longer mechanically connected with the choke valve but merely passes on the particular driver's decision to the electronic control instrument which then, with the help of electrical adjusting members, controls the engine and the gears in such a manner that the desired performance is attained always with the widest possible open choke valve and the smallest possible crankshaft rpm.

The possibilities of no-shift automatic power systems become clear already through the range of driving speeds which exists at an engine rpm of 1,000 min^{-1}: 8 km/hr up to 45 km/hr. Investigations concerning a driving speed of 130 km/hr--which in the case of Eve would correspond to an output requirement of 15 kw--resulted in the following rpm/consumption values: 2,000 min^{-1}/4.78 lit/hr; 3,500 min^{-1}/5.62 lit/hr (+ 18percent); 5,000 min^{-1}/6.97 lit/hr (+ 46 percent). Illustrating the connection between the rpm, the output, and the consumption in one performance graph was used by the experts in the dashboard dials.

Consumption Shown on Video Screen

In addition to the central digital indication of the driving speed, the dashboard contains two novel instruments: On the left, the engine consumption graph on which a moving luminous point indicates the particular output in the consumption graph over the rpm. The right scale shows the consumption as a function of the driving speeds. Here again this is done by means of a moving luminous point.

In the next step in this project, the engineers at Regie Renault want to look into the engines. The efficiency of the subsystems is to be increased with the help of novel combustion methods.

A design investigated at the time pursued the goal of energy recovery during vehicle braking and a similar variant is being considered for the engine-gear management, similar to the one that was already put into the Mercedes-Benz research car (see VDI-NACHRICHTEN No 42, 82): Possibility of choice between differing, typical engine types with the objectives of consumption minimizing in superhighway traffic, reduction of harmful substance emission during city driving, and reduction of noise level during city driving at night.

The electronic control of engine and gear operation, determined by performance graphs, in the case of no-shift power transmission is certainly the most promising concept for optimum economical drive. Considering the present state of component development, a solution ready for series production is certainly no longer utopian.

Comparison of Technical Data

			Renault 18	Renault Eve
1	Motor-Hubraum	[cm³]	1397	1108
2	Leistung	[kW]	47	39
3	bei Drehzahl	[min⁻¹]	5500	5500
4	max. Drehmoment	[Nm]	103	81
5	bei Drehzahl	[min⁻¹]	3000	3000
6	Leergewicht	[kg]	920	845
	Luftwiderstandsfläche (c_wxF)	[m²]	0.728	0.446
7	Höchstgeschwindigkeit	[km/h]	150	157
8	Beschleunigung 0-100 km/h	[s]	17.1	18.3
9	Verbrauch auf 100 km	[l]		
10	bei 90 km/h		6.0	4.1
11	bei 120 km/h		7.8	5.5
12	Stadtzyklus		8.6	6.6
13	Drittelmix		7.5	5.4

Key: 1--Engine stroke volume; 2--Output; 3--At rpm; 4--Maximum torque; 5--Empty weight; 6--Air resistance surface (c_WxF); 7--Maximum speed; 8--Acceleration, 0-100 km/hr; 9--Consumption per 100 km; 10--At 90 km/hr; 11--At 120 km/hr; 12--City driving; 13--Thirds mix.

The concept of the Eve experimental car by Renault (the photo shows a model) is an entirely realistically designed utility vehicle.

Vesta: High Mileage

Duesseldorf VDI NACHRICHTEN in German 5 Nov 82 p 27

[Article by O. v. F.: "Driving 100 km with 3 Lit Fuel"]

[Text] With 50-percent financial assistance from the French Industry Ministry, Regie Renault, in addition to the "Eve" project, created a second experimental and research vehicle which was presented to the public in October. The Vesta project (Vehicule Economede Systemes et Technologie Avances--Economical Passenger Car with Advanced Technology and Systems) pursues the goal of developing a compact four-seat car with an "average consumption" of only 3 lit per 100 km which can be made in large series during the 1990's.

The project was tackled early in 1981. Work included investigations of proposals for an improvement of the engine and gear efficiency, reduction in losses due to friction and the need for running secondary power systems as well as ways to improve aerodynamics.

The Vesta is 3,200 mm long (the VW Polo is 3,655 mm long) and is 1,520 mm wide. The engine, which is installed laterally in the front of the car, drives the front wheels. For the model presented, an air resistance coefficient (c_W) of 0.22 was mentioned although the resistance increase due to engine cooling was not taken into consideration. The weight likewise is not yet firm because further investigations are in progress here. The company's engineers expect to attain the goal of 520 kg.

The emphasis in research seems to be on the engine. Work extends to fields such as combustion chamber designs, combustion processes, mixture formation and distribution, reduction of friction losses, and improvement of thermal efficiency by raising the operating temperature.

Fuel Consumption Target

Constant	90 km/hr	2.28 lit/100 km
speed	120 km/hr	3.64 lit/100 km
City driving		3.05 lit/100 km
Thirds mix		2.99 lit/100 km

Research efforts, whose results are to lead to a spectactular consumption reduction, obviously have been making good headway. The calculated consumption for an internal reciprocating combustion engine now under development is below the target given, according to data from Renault.

The Vesta experimental car is a study for large-series auto production during the 1990's. In the thirds mix it is supposed to use less than 3 lit fuel and it is supposed to weigh no more than 520 kg; the VW Polo weighs in at about 700 kg. The extremely small air resistance coefficient (c_W) of 8.22 reportedly helps attain the fuel consumption target.

5058
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BRIEFS

BRITISH LEYLAND ANNOUNCES 'MAESTRO'--Paris, 28 Feb (AFP)--Following the "Metro," British Leyland's "Austin-Rover" group has announced the roll-out on 1 March in Great Britain of the "Maestro," a new 2-compartment hatchback model in the intermediate vehicle class. The Maestro line, which will appear in seven versions powered by 1,300 and 1,600 cc engines, falls into a bracket that represents 60 percent of sales on the British market and will vie directly with the Ford Escort. A 5-door sedan, front-wheel driven by a transversally mounted engine and, unlike the Metro, front-end gearbox, the Maestro will be offered with a choice of four power plant configurations: Standard 1,300 cc, 68 hp, 4-speed transmission; 1,300 cc hle _high-elastic-limit_, 64 hp, 3 speeds plus one economy speed; 1.6 liter Series "R", overhead camshaft, 81 hp, 4 speeds; 1.6 liter HLS and MG 1.6 liter, 102 hp, 5 speeds, 177 km/hr. To these six models is added the "Vanden Plas," a deluxe sedan, with 1.6-liter, 81-hp motor, 5-speed transmission and an array of equipment, including a speech synthesizer (with which also the MG is equipped). The Maestro, 4 m or 4.04 m long depending on the model, will appear to the French to be much closer to the Renault 9 (4.06 m) than to the Renault 5 (3.52 m) or the Peugeot 205 (3.70 m). It will stand out because of its width: 1.68 m (Renault 9: 1.65 m), but may appear a bit heavy: 875 to 985 kg, depending on the model, versus 805 to 840 kg for the Renault 9. Economy of operation was given special study: Oil change every 19,320 km, repl[illegible]ent of spark plugs every 68,630 km, "long-life" battery, electronic regulation of idling, etc... The Maestro will not be on the market in France before October 1983. [Text] [Paris AUTO-INDUSTRIES in French 28 Feb 83 pp 2-3] 9238

BRITISH LEYLAND RECEIVES FUNDS--London, 1 Mar (AFP)--The British government has agreed to make available to British Leyland, the nationalized automobile manufacturer, supplementary funding in the amount of 100 million pounds to subsidize the launching of its new models this year, it was announced by Mr Norman Lamont, deputy minister of industry, to the House of Commons on 28 February. The announcement of this measure came on the eve of the launching of the new "Austin Maestro," on which British Leyland is pinning high hopes. The subsidy will be disbursed only if British Leyland specifically requests it and on condition that the enterprise itself also seek private financing of its future funding needs, Mr Lamont said. The government had already granted British Leyland 620 million pounds in 1981 and 370 million in 1982. [Text] [Paris AUTO-INDUSTRIES in French 1 Mar 83 p 2] 9238

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WEST EUROPE REPORT

SCIENCE AND TECHNOLOGY

No. 142

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FRG RESEARCH MINISTER CALLS GENETIC ENGINEERING KEY TECHNOLOGY

Basic Research Urged

Frankfurt/Main FRANKFURTER RUNDSCHAU in German 22 Feb 83 p 1

[Article: "To Regain Our Position, Riesenhuber Wants to Promote Basic Research Oriented Toward Application"]

[Text] Bonn, 21 February--Federal Research Minister Heinz Riesenhuber (CDU) wants to make the Federal Republic competitive again on an international scale in the field of basic research oriented toward application by promoting research centers. In his estimation, the Federal Republic has "removed itself from international discussions" in this field during the past years.

As proof for this conclusion, in an interview with Gerda Strack, the Bonn FR correspondent, Riesenhuber advanced the observation that German chemical firms are looking for laboratories in the United States and are awarding research contracts to them. But the Federal Republic has to catch up not only with the United States but also with France, England and Japan, for instance, in biotechnology.

To Riesenhuber, biotechnology is the "key technology" of future decades. It is expected to play the same important industrial role during the next hundred years that chemistry has played in industrial development during the 20th century. Among others, the minister wants to promote especially the cultivation of very hardy crops, resistant to parasites. Biotechnology will also make it possible to cultivate plants which assimilate nitrogen directly. This will make the use of chemical fertilizers, a burden on the environment, largely superfluous.

Riesenhuber Interview Report

Frankfurt/Main FRANKFURTER RUNDSCHAU in German 22 Feb 83 p 4

[Report on Interview with Federal Research Minister Heinz Riesenhuber by Gerda Strack: "Bonn Entices Bio-Scientists;" Date and Place Not Given]

[Text] Federal Research Minister Heinz Riesenhuber (CDU) wants to entice back into the FRG scientists from the United States with attractive research positions in regional centers of gene technology. Thereby he anticipates a reduction of the need to catch up with other countries. The current regulations which guard against the dangers of biotechnological experiments will not be changed by Riesenhuber. Gerda Strack, our correspondent in Bonn, interviewed the research minister.

To Riesenhuber, biotechnology is a "key technology" in the decades to come which is expected to play as important a role during the next hundred years as did chemistry in the industrial development of the 20th century.

In the future, the minister of research wants to promote, above all, the manufacture of valuable pharmaceutical products and the cultivation of new plants. Biotechnology enables us to produce plants which are particularly hardy or resistant to parasites. Also, plants could be cultivated which, because of their ability to assimilate nitrogen directly, would make the use of chemical fertilizers, a burden on the environment, largely superfluous.

To Riesenhuber, the artificial production of insulin is a good example of the "new chances for interaction with nature" through biotechnology. The minister also wants to support the development of cell culture methods as an alternative to animal experiments. Riesenhuber has asked a group of 10 specialists from the sciences and economy to submit, by this summer, proposals for additional central trends in biotechnology and its branch, gene technology.

According to Riesenhuber's view, above all, basic research oriented toward application must be urgently promoted in order to make the FRG competitive on an international scale. During the past 3 years, the FRG "has removed itself from international discussions." German chemical firms have allegedly sought out laboratories in the United States. But, in biotechnology, the FRG needs to catch up with France, England and Japan as well.

Risenhuber hopes to overcome the backwardness of the FRG, especially in gene technology, by means of favorable working conditions for scientists. New regional "centers of gravity" for gene technology in Cologne and Heidelberg, supported by the Ministry of Research, could offer attractive workplaces even to experimental scientists who had moved to the United States during the past years. Risenhuber wants to equip a third regional center for gene technology in Munich, jointly with the Max Plank Society.

Risenhuber wants to assign to the Society of Biological Research in Braunschweig, supported by the Federal Department of Research, an "intermediary role" between basic research and applied research. The splendidly equipped institute so far has only a few contracts for collaboration with industry. The minister toys with the idea to have a gene bank established there as a service to science and industry. It could, for instance, supply microorganisms and cell cultures to laboratories.

Risenhuber does not plan either to tighten or to loosen the current guidelines protecting against the dangers of biotechnological experiments. In his view, the guidelines are "in order." They regulate the protective shielding of the laboratories for such research and prescribe the safety barriers, for instance, when handling bacteria.

In the future, human experiments are also conceivable. Therefore, Riesenhuber wants to establish the "limits of manipulation" through a debate of principles by scientists and theologians. In the minister's view, changes in the human genetic makeup are among those experiments which will definitely not be permitted.

2473
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BIOTECHNOLOGY

ELF PURSUES DIVERSIFICATION INTO BIOTECHNOLOGY

Paris L'USINE NOUVELLE in French 3 Feb 83 p 42

/Article by Bertrand Le Balc'h: "Elf Reinforces Its Presence"/

> /Text/ The creation of a GIE /Economic Interest Group/ (Monserbio) in cooperation with the dairy group, Entremont, should enable Elf to pursue diversification into biotechnology, with special focus on the agro-food market.

Elf-Aquitaine, the second largest French oil group, is entering the agro-food market. Its subsidiaries, Sanofi, Elf Bio-Industries (EBI) and Secta Yves Rocher, have just created an economic interest group, called Monserbio, in cooperation with the dairy group, Entremont, that plans to study, develop and valorize milk using biotechnological methods. At the same time, Sanofi, EBI and Yves Rocher have acquired 34 percent interest in Entremont's capital (1,750 wage-earners, turnover of 1 billion francs).

From oil to milk, the correlation is not immediately obvious. Yet, from Elf-Aquitaine's standpoint, this operation is consistent with industrial logic: along with pharmacy, chemistry, energy, agriculture and pollution treatments, the agro-food sector is one of the choice areas in biotechnology. Moreover, bioindustry is one of the areas of diversification selected by Elf-Aquitaine. As the group, under the presidency of Albin Chalandon, has been involved for a long time in energy, health, chemistry, and more recently, in seeds, it was logical that it would one day penetrate into the food sector. "Monserbio's research should lead to the development and marketing of new products involving foods and dietetics, but also pharmacy, cosmetics, flavorings and animal feed," Sanofi said.

First in line in the Monserbio operation, the young pharmaceutical subsidiary of Elf-Aquitaine is the "hard core" of the group in bioindustry. Its turnover in biological products, which has been rapidly increasing, reached 1.2 billion francs in 1981 (15 percent of its total sales volume).

Sanofi's bioindustrial activities are concerned mainly with human and animal health (antibiotics, vaccines, serums, neuropeptides, diagnostic reagents through the companies: Institut Pasteur Production, Choay, Clin-Midy and Sanofi Sante Animale.

Sanofi, which has excellent skills in genetic engineering, immunology and in the synthesis of peptides, finds in Entremont a partner that has considerable know-how in fermentation, as it is among the leading French manufacturers of emmenthal. We know that fermentations, along with enzymatic engineering and genetic engineering, are an essential component in the field of biotechnology.

Close Collaboration Between EBI and Sanofi

The relatively recent (1980) creation of Elf Bio-Industries has materialized Elf-Aquitaine's desire to create a second bioindustrial "pole" next to that of Sanofi, and independently from the other existing subsidiaries (Ceca, Rousselot). As of now, EBI's growth (sales volume of 200 million francs) is in the seeds sector, ever since Saint-Jeannet Lasserre took over the Occitane des semences [seed company] and joined the Groupement Agricole [farm association] of Essone.

However, for some time these two "poles" have been linked by a closer cooperation. Besides the Monserbio operation, Sanofi and Elf Bio-industries are now cooperating in building a large biotechnology research center at Labege, near Toulouse. It is planned to open in 1984.

In all, Elf-Aquitaine's bioindustrial activities represent a turnover of about 2 billion francs. This is little compared to its overall turnover (125 billion francs in 1982), or to the world's market of "bio" products (a current figure of about 90 billion francs that is expected to double by 1990, according to Bioconsult). All the same, this is just a starting point. In the biotechnology mobilization program, Elf-Aquitaine is still considered to be one of the two major development poles of this activity in France, the other being Rhone-Poulenc.

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BIOTECHNOLOGY

CODIS TO AID THREE BIOTECHNOLOGY COMPANIES

Paris L'USINE NOUVELLE in French 10 Feb 83 p 52

[Article by Bertrand Le Balc'h: CODIS: Three New Elects]

> [Text] With the three small companies: Clause, Claeys-Luck, Clonatec, the role of the PME's [Small and Medium-Sized Businesses] will become more significant among the biotechnology firms registered with CODIS. Curiously, the largest firms have taken a long time to react.

CODIS (Steering Committee for the Development of Strategic Industries) will support the industrial investment projects of Clause, Claeys-Luck and Clonatec, three companies engaged in biotechnology.

Specialized in cooking grains and flower seeds, Clause (16,000 wage-earners) reached a turnover of 604 million francs during the fiscal year 1981-1982, including about 10 percent for exports. The group, very dynamic on the commercial level under the presidency of Philippe Claeys, will be able to strengthen its research capacity with CODIS' aid (Claeys-Luck has just acquired a new laboratory, located in Gers).

As for Clonatec, it is a very young company, created at the initiative of a hospital research worker for making ultra-specific reagents, monoclonal anti-bodies. Its greatest originality is having known how to cooperate right from the beginning with high-level research teams with good know-how and with a desire to valorize their work. "We will begin with reagents used in the health and agro-food sectors. However, at present, we are looking for a place to set up our facilities," stated one member of the management. Clonatec, that is preparing for an increase of capital, has choice partners among its shareholders: Idianova, AEC [Atomic Energy Commission], Credit Agricole and Banexi.

The Beginnings of Sanofi, Rhone-Poulenc and Roussel-Uclaf

With Clause, Claeys-Luck and Clonatec, this brings to 13 the number of firms retained by CODIS since biotechnology was incorporated in its program. Most of these are PMI's [Small and Medium-Sized Industries] engaged in the pharmaceutical industry and in the seeds sector. Publid aid (ANVAR [National Agency

for the Valorization of Research, research fund credits, industrial policy credits, FDES loans) mobilized to their benefit amounts to 140 million francs. It corresponds to an investment program of 620 million francs over a 5-year period that should generate a turnover of 3 billion francs for biological products over the horizon to 1985.

Large groups, that took longer to react than the PMI's, have recently knocked on CODIS' door. Thus, following Roussel-Uclaf, Sanofi and Rhone-Poulenc presented their biotechnology plans last December. They are now under study. On the sectorial level, it should be mentioned that CODIS will focus its efforts on agro-food products.

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ELECTRONICS

SURVEY OF FRG ELECTRONICS INDUSTRY, NEW DIRECTIONS

Paris L'USINE NOUVELLE in French 20 Jan 83 pp 59-61

[Article by Patrick Stephan]

[Text] German electronics is coming out of its isolation. It is orienting towards international cooperation and growing dependence with respect to Japan and the United States. A strategy that makes use of massive dissemination of microelectronics and the creation of a telematics industry.

The electronics and data processing industry in FRG is at a crossroads. Sorely tried by the Japanese and the AEG court settlement, electronics is seeking a path in FRG. The present goal is two-fold: encourage massive dissemination of microelectronics and its applications in industry, and scatter assistance widely among the largest possible number of enterprises, and particulary among PME (small and medium-sized enterprises).

From 1982 to 1984, the special program stipulates expenditures of 300 million marks, and limits non-refundable subventions to 800,000 marks per enterprise in order to avoid favoritism toward large companies. One-half of the funds allocated to microelectronics (120 million marks in 1981) were invested in chip production. The government thus expects to help electronics close some of the gap with respect to its Japanese competition, a gap that is significant. While German industry is first in the traditional trades of mechanics and chemistry, it is far from having reached this position in electronics.

Have the German computer plans enabled FRG to place its manufacturers on the European or world market, and assure its technologic independence? As a whole, no. The country is of course becoming computerized in giant steps: FRG is first in Europe in terms of installed computers (26.6 percent in value), ahead of France (19.6 percent), the United Kingdom (16.6 percent), Italy, and Benelux; it is third in the world after the United States and Japan. But this large consumer of computers does not show the same performance in production, resulting in a deficit balance of trade since 1978 (801 million marks in 1981) and a modest position for its national manufacturers.

Increasingly greater dependence. Balance of trade since 1973 (billion marks)

Evolution de la balance commerciale depuis 1973 (en milliards de marks) (D)

	(A) Production allemande			(B) Exportations			(C) Importations			Consommation apparente		
	MB(*)	Inf(**)	Total	MB	Inf.	Total	MB	Inf.	Total	MB	Inf.	Total
1973	2,277	3,729	6,006	1,509	2,150	3,659	1,017	1,787	2,804	1,785	3,366	5,151
1978	2,624	5,439	8,063	1,911	2,825	4,736	1,440	3,249	4,689	2,153	5,863	8,016
1981	2,008	7,928	9,936	1,926	5,257	7,185	1,865	6,058	7,923	1,945	8,729	10,674

Source : Syndicat allemand de la bureautique et de l'informatique (affilié au VDMA).

(*) MB : machines de bureau, y compris machines à dicter, à photocopier et à microfilms.
(**) Inf. : ordinateurs et équipement informatique.

1978 est l'année du déficit de la balance commerciale en informatique (801 millions de marks en 1981). La consommation apparente s'accroît constamment de 1972 à 1981, traduisant une dépendance technologique de plus en plus grande à l'égard des concurrents américains et japonais.

Key: (A) German production
(B) Exportations
(C) Importations
(D) Apparent consumption

Source: German Union for Office Automation and Information Processing (affiliated with VDMA--Union of Machine Construction Plants)

(*) MB: office machines, including dictation, photocopy, and microfilm machines
(**) Inf.: computers and computer equipment

1978 is the year of the deficit in the information processing balance of trade (801 million marks in 1981). Apparent consumption decreases constantly from 1972 to 1981, reflecting an increasingly greater technologic dependence with respect to American and Japanese competitors.

For instance: in FRG, Siemens is only second (18.7 percent share of the market), far behind IBM (47.2 percent), while Nixdorf is sixth (2.5 percent). Without the massive support of the government, shareholders, or corporation user divisions, such companies as Kienzle, Olympia, or Triumph-Adler would have been bankrupt long ago.

The results of German firms have been strongly eroded by the price cuts IBM has made to counter the offensive of IBM-compatible computer manufacturers.

Overall, the German data processing industry shows large losses. Nixdorf's profits are consequently creating a sensation. With a turnover of 1.9 billion marks (against 2.2 billion for Siemens), Nixdorf wants to become Europe's

Leading European country in installed computers: computers installed in Europe (end 1981).

Premier pays européen pour les ordinateurs installés...

Parc d'ordinateurs installés en Europe (fin 1981)

	(A) Nombre d'installations	(B) Part de marché en quantité (%)	(C) Valeur (en millions de dollars)	(D) Part de marché en valeur (%)
Allemagne fédérale	118 953	28,3	15 609	26,6
France	74 467	17,7	11 480	19,5
Royaume-Uni	68 558	16,3	9 767	16,6
Italie	59 449	14,1	6 351	10,8
Benelux	28 947	6,9	4 754	8,1
Scandinavie	26 497	6,3	4 615	7,8
Suisse - Autriche	24 363	5,8	3 669	6,2
Espagne - Portugal	19 579	4,7	2 508	4,3
Total	**420 813**	**100**	**58 753**	**100**

Key: Federal Republic of Germany
France
United Kingdom
Italy
Benelux
Scandinavia
Switzerland-Austria
Spain-Portugal

But Siemens is far behind IBM: computers installed in FRG, by manufacturers (end 1981).

... mais Siemens loin derrière IBM

Parc d'ordinateurs par constructeur installés en RFA (fin 1981)

	Nombre d'installations	Part de marché en quantité (%)	Valeur (en millions de dollars)	Part de marché en valeur (%)
IBM	13 842	11,6	7 386	47,2
CII-HB	2 840	2,4	837	5,4
Siemens	8 293	7,0	2 930	18,7
ICL	510	0,4	133	0,9
Univac	904	0,8	548	3,5
DEC	13 887	11,7	518	3,3
Burroughs	361	0,3	97	0,6
CDC	80	0,1	190	1,2
NCR	2 192	1,8	181	1,2
Hewlett-Packard	3 130	2,6	278	1,8
Olivetti	5 600	4,7	90	0,6
Nixdorf	6 826	5,7	386	2,5
Data General	2 960	2,5	96	0,6
Sems	130	0,1	10	0,1
Autres	57 654	48,4	1 964	12,6
Total	**119 209**	**100**	**15 644**	**100**

Source : « Databook »

Key: (A) Number of installations
(B) Percent share of the market in quantity
(C) Value (in million dollars)
(D) Percent share of the market in value

number one supplier of banking terminals, and orients the German strategy toward greater specialization. The secret of its success is simple: limited involvement in costly production processes, unlike Kienzle, Triumph-Adler, or Olympia, and an international thrust.

Following the failure to create a European information processing pivot within EEC, the German companies are gradually emerging from their isolation to form extra-European alliances. Together with the Israeli company Elbit, Nixdorf developed the high-power 8890 computer which it now builds and distributes under its own name in FRG. Sales of the 8890, compatible with IBM's 370 and 4300, have even begun in the United States in 1981.

But the goals of the two partners do not stop there. They are planning the development of another, more powerful compatible computer, of the IBM 4341 class. More decisive yet, is Nixdorf's entry into the United States, through the 1977 acquisition of Entrex. Beginning in that year, it became one of the large American manufacturers of keyboard systems. And in 1979, at the Hanover Fair, Heinz Nixdorf hatched the idea of a compatible computer. In order to gain a foothold in the market, he bought Computer Software Company, a specialist in the distribution of IBM system software. And he also expanded the utilization areas of the 8890 by recently signing cooperation contracts with Spartacus Computers Inc.

In 1981, the American subsidiary had a turnover of 1.6 million dollars (1.1 billion francs), and sold the 620 (8850 in Europe), 8860, 8890, and 8840 systems; it contributed about 21 percent of the group's turnover. This performance was poorer than that of Triumph-Adler (United States turnover of about 2.9 billion francs, or 57 percent of the consolidated turnover), which is the leading European group specializing in office automation and data processing. It employs 4600 persons in its Adler, Royal, Royal Business Machines, and Pertec Computer Corporation subsidiaries.

But the German involvement on the American market, where it is an European pioneer, also concerns other enterprises: Mannesmann-Tally, manufacturer of computer printers; BASF Systems, which produces magnetic tapes and cassettes; AEG-Telefunken, which acquired a 25 percent participation in Modcomp (minicomputers); and Olympia.

Siemens Fully Expects To Be Out of the Red in 1983

Siemens' approach has been quite different. The Munich group devotes only a small part of its turnover to information and peripheral systems. It sells laser printers through Univac and Datagraphix, remote printers, teletex machines, and multiplexers. It is mostly in components that it cooperates with the large American companies. First of all with Intel, in integrated circuits for telecommunications; the two companies have had a cooperation agreement for microcomputers since 1976. Next with IBM, with whom it recently concluded a contract of 50-60 million dollars over five years, for 64K memories.

In the area of large computers, its unfortunate alliance with Philips and CII as part of Unidata in 1976, which determined the Honeywell action, led it to change its strategy: avoid a frontal confrontation with IBM in order to cooperate with it. In other words, Siemens was forced, like the British ICL, to distribute the IBM-compatibles of the Japanese Fujitsu. And it is indeed toward Japan that are directed the sights of the world's fifth-largest group of electrical and electronic industries, a late arrival on the information processing battlefield (5 percent of its consolidated turnover).

Its alliance with Fuji Electric goes back to 1923. It was bolstered by the creation of a joint company, Fuji Electronic Components, which in 1981 started producing electronic components. Siemens is carrying in its catalog the large computers of Fujitsu, which will be delivered during the first and second quarters of 1983. Klaus Kessler, the new head of the division, thus expects to strengthen the group's position in the IBM strategy.

The agreement with the Japanese firm does not mean an end to the production of its own machines, which started in 1950, no more than a reduction in the range of minicomputers becomes synonymous with a retreat on this market. These are clear answers to the rumors that have circulated following the restructuring and losses of 1981. Peripherals have been reassigned to the communications division, and minicomputers to electric power. In 1983, Siemens fully expects to be out of the red.

Telematics to Fly the German Pennant in the World

German information processing has two ailments: inadequate mastery of basic technologies, complicated by increased dependence on Japan; and lack of a true standing on the world market. To stop the American-Japanese advance, Siemens and Philips have reached a co-financing agreement for research and development expenses in microelectronics. These two handicaps have not cooled the enthusiasm of the corporations in seeking diversification in a rapidly growing sector. Such groups as Mannesmann (metallurgy), BASF (chemistry), Bosch (electronics), or Volkswagen (automobile) have negotiated with varying degrees of success the shift to electronics and information processing. They orient their development policies toward objectives of the future, such as telematics. Telematik Systemplanung Gmbh, created with equal shares by AEG-Telefunken, Mannesmann, and Bosch at the beginning of last year, has received approval from the Cartel Office in Berlin.

With a turnover of 5 billion marks and 45,000 employees, will the telematics association be able to fly the German pennant over the world? Or will it limit its expectations to being only a thinking group without an industrial strategy? The stakes are large, concerning as they do German information processing, its technologic maturity, and its independence.

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PROGRESS REPORT ON EFFORTS TO DEVELOP ELECTRONICS INDUSTRY

Paris ELECTRONIQUE ACTUALITES in French 28 Jan 83 pp 1, 16

[Article by J.-P. Della Mussia]

[Text] During the first meeting of the national committee of the rallying program Mastery of the Development of the Electronics Industry, on 20 January, the growth of this program since its inception last July was examined, and Mr Chevenement, minister of Research and Industry, disclosed that the R&D budget of the sector will be 8000 million francs (MF) in 1983, compared to 6300 million francs in 1982.

Also announced, was the feasibility study for a large French scientific computer, as well as the formation of a public interest group (GIP) composed of CII-HB, CNET (National Center for Telecommunications Studies), and INRIA (National Institute for Research on Data Processing and Automation) devoted to the large scale industrialization of the scientific minicomputer SM90.

According to the newspaper LE MONDE, the 1982 deficit of the French electronics sector had reached 12 billion francs with a turnover of the order of 120 billion francs, from 6 billion francs with a turnover of 96 billion francs in 1981.

But this fact is not associated with the launching of electronic industry actions.

Last July, the government had decided to launch a large four-pronged program to benefit the electronics industry: research and technologic development policy, industrial policy, utilization policy, and training. The implementation of the first two policies resulted in measures taken to increase research efforts by coordinating the activities of public laboratories, and by launching national projects designed to assure the transfer of research results to industry.

R&D: +27 Percent in 1983

In financial terms, the inducement credits allocated for the development of the electronics sector will, according to MRI (Ministry of Research and Industry), go from 6.3 billion francs in 1982, to about 8 billion in 1983. These amounts include the financing of actions conducted by DIELI (Directorate of Electronics and Data Processing Industries), and under the title of studies, by the Ministry of PTT (General Directorate for Telecommunications-DGT) and the Ministry of Defense (General Delegation for Weapons-DGA). For the interministry research allocation, credits (except for ANVAR-National Agency for Implementation of Research) have gone from 1280 MF in 1982, to 1612 MF in 1983; they include activities financed from research funds, budgets for electronics within CNRS (National Center for Scientific Research), INRIA, AEC, ADI (Data Processing Agency), as well as from part of DIELI's endowment.

In 1982, public electronics research employed 6500 people at a cost of 1700 MF (of which 1500 people/200 MF with separate salaries at CNET, AEC, INRIA, CCETT-Joint Center for Television and Telecommunications Studies, and CELAR-Center for Electronics Weapons).

At the same time, MRI estimates that 1982 industrial research costs amounted to 12,000 MF, including all military and telecommunications studies. Three agencies have provided most of the 6200 MF of the inducement credits mentioned earlier for R&D in 1982:

MRI used two budget sources: one, gathering the research fund endowments of ADI and ANVAR for 450 MF; the other, derived from the development program managed by DIELI, representing a sum of 650 MF.

The Ministry of PTT, whose DGT allocation for the electronics sector was of the order of 1800 MF in 1982.

And the Ministry of Defense, whose allocations for the electronics sector represented 3100 MF in 1982.

First Interlaboratory Collaborations

The research effort is coordinated primarily in the area of electronic components, with the following objectives: creation of a development pivot for III-V components, joining CNET, CNRS, and interested university laboratories; implementation of a joint program committee between Centre Norbert Segard and LETI (Electronics and Data Processing Laboratory) in Grenoble; and strenghtening the GRECO activity within CNRS and universities, the ARA (Advanced Automation and Robotics) activity in robotics, and LETI for display components.

In addition, Mr Chevenement stated that in the passive components area, "research teams must be reorganized to attain a critical mass."

Eight National Projects

As we know, this effort of research coordination and rational reorganization is extended to industrial enterprises, and structured within the framework of national projects.

Since July, six of the eight projects defined are being evaluated: their effective inception, given a decision from the electronics industry interministerial committee, could occur before the end of the first half of this year.

The evaluation phase of the National VLSI CAD Project began last June; the evaluation group created for this purpose includes experts and representatives from the various agencies involved in the project (DIELI, DGA, DGT, MST, CNET, ADI) and is co-chaired by Mr Nivelet (DIELI) and Mr Rault (ADI).

The first phase of the group's work was completed on 2 November of last year, with the public announcement of the project framework, which consists of three major actions:

Design and industrially manufacture a modern hardware and software architecture of CAD tools (3-5 years objective) based on the latest scientific findings;

During the next three years, expand and complete CAD systems available in industry and public research, until the products resulting from the preceding action become available;

Rapidly create for one or more of the national industries, a major service capable of producing with very short deadlines, prototype circuits for industrial or university needs, while assuring the confidentiality of these circuits.

The evaluation group has already received a large number of proposals from industrialists and research laboratories.

Display Project: Imminent Launching

The evaluation phase of the Display National Project also began last June; the evaluation group formed for this purpose consists of representatives and experts from the various interested agencies (DGA, DIELI, MST, DGT, INRIA, CNET) and is chaired by Mr Cazaubon, from DGA.

The framework project was made public last November, proposing the development of three types of products:

Large, mass produced, liquid crystal flat screens;

Second generation Videotex terminal (alpha photographic);

High definition, bit-map graphic system (work station based on the SM90, and close liaison with the conclusions of the Image Research Task Force, and thus with the Image Plan).

Based on this framework project, a number of proposals have been sent to the evaluation group by industrialists and research laboratories. A declaration to launch the national project could thus be issued in the coming weeks.

The evaluation group for the EAO (Computer Assisted Education) National Project was also created on 2 December of last year; it consists of representatives from the various agencies involved (National Education, Professional Training, MST, DIELI, DGA, DGT, ADI) and is chaired by Mrs Cazala (ADI). The group has already established many contacts with the industrial, research, and user communities: a user group has in fact been formed, combining the major users representative of the world of enterprises and of National Education. The framework project could be established about mid-February.

The Computer Assisted Translation (TAO) evaluation group was created at the end of November; it consists of representatives of agencies interested in TAO (Foreign Relations, National Education, DIELI, DGA, DGT, MIDIST-Interministerial Task Force on Scientific and Technical Information, ADI), and is chaired by Mr Oziard (ADI). The group has established a number of contacts with the scientific and industrial community, and has created a group of users combining representatives of enterprises and organizations which are large TAO users. The framework project could be established at the beginning of February.

The evaluation group for Computer Assisted Design and Manufacturing (CAD/CAM), created at the beginning of December, is composed of representatives and experts from agencies and organizations interested in this topic (DGA, DGT, DIELI, MST, ADI, CNRS, INRIA), and is chaired by Mr Lechanteux (DIELI).

The framework project was presented to the scientific, industrial, and user commission on 17 January; it proposes the creation of CAD/CAM tools and systems according to four priority topics:

Scientific and technical computation of physical objects;

Computer assisted design;

Computerized production management;

Control system for automated machines and production robots (software).

Based on this framework project, proposals are expected for 15 February.

The evaluation phase of the Software Engineering National Project began on 1 December with the creation of an evaluation group consisting of representatives of interested agencies and organizations (DGA, DGT, DIELI, MST, CNET, INRIA, ADI) and is chaired by Mr Samier (DGA).

The framework project has been presented to the scientific, industrial, and user community; it is geared around a major activity, the definition of hardware and software for a software engineering station, which could provide a basic structure for anticipated subsequent developments. This work station would include a unified hardware and architecture, allowing for maximum modularity. Priority is assigned to the development of this system based on a SOL/UNIX language.

Based on the received proposals and declarations of intent, the committee will analyze the appropriatness of immediately starting the development of a second line of equipment using artificial intelligence standards, namely the LISP language.

Two Delayed Projects

For the national project Elementary Modules for Minicomputers, Mr Chevenement has only declared that "it will provide such diverse sectors as mini- and micro-computers with the architecture and components common to the computers of the future. This project will also play a major role in defining, by the end of this decade, the computers needed by our National Defense."

The last national project is consumer electronics. On this subject, Mr Chevenement regrets that there are few laboratories to rally in this field: "Except for CCETT, TDF (Television de France), and INA, there are 25 times fewer researchers in France than in Japan. Even though our industry is a new one, this is too little. Consumer electronics research is very inadequate; it must be created. This is not only an industrial necessity, but a cultural one as well. And it is also offers opportunities to many enterprises, given the current diversification of this activity."

Lastly, Mr Chevenement declared that the Ministry of Defense together with MRI would study a future project for a large scientific and industrial computer (which would thus constitute a ninth national project, see below), and that 500 MF would be invested immediately for all the projects, of which 200 MF would be public credits on the 1983 budget. Before ending his speech to the national committee of the electronics industry, Mr Chevenement "strongly reiterated to public research organizations that the nation cannot maintain a staff of 6500 persons, which is the present number of researchers in the electronic industry's public laboratories, without expecting more from them than scientific and cultural fallout: they must cooperate with the industry and users."

Project for Large French Computer

"For its own needs, the military wants a large French computer, and it will have it. This being so, why not join this project and develop at least cost a version which could be sold, even if this computer is thus far not one of our civilian priorities?" This is not the sentence that Mr Chevenement voiced to the press, on 20 January, on the occasion of the first work session of the national committee of the electronics industry; but this is how the reporters

present at the time, interpreted his words. The minister's prudence in speaking only of a project study, is explained by the fact that the major portion of the project will not be financed by MRI, but by the military, which wants to remain as independent as possible from a possible American computer embargo. Answering a reporter's question, Mr Chevenement nevertheless stated that this was "a feasibility project that could be pursued quite far."

The study of this large computer would be entrusted to CII-HB and Sintra, but a large scale industrial production does not appear to be planned. It would be limited to supplying the French needs, which are estimated at about 30-40 machines for 1990. The development cost would be of several hundreds of million francs. The defenders of this ninth national project are stressing the fallout that such a study could provide for French electronics in general.

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ELECTRONICS

FIRST FRENCH SYSTEM FOR COMPUTER-AIDED DRAFTING MARKETED

Paris COMPOSANTS in French Jul/Aug p 8

[Unsigned article: "DAO: The First French System is Born at Graphael"]

[Text] Graphael has just placed on the market the first French two-dimensional computer-aided drafting (DAO) system, the Alpha G2.

The system consists of a digitalization table for reading existing drawings, which by means of a menu allows the creation of new drawings, as well as a graphics screen display which indicates the current stage of the drawing. Added to this is a computer assembly composed of a Data General MP 100, and of a mass memory consisting of a 12.5 Mbyte Winchester drive and a 1.26 Mbyte floppy-disc reader. To operate the system, the software developed with ANVAR's (National Agency for Implementation of Research) assistance allows designers to use all the graphic functions necessary to draw plans, layouts, and so on.

The complete system, including software, sells for 260,000 francs, without taxes.

Graphael has high hopes for Alpha G2; its CAD (computer-assisted design) experience indicates that these hopes are well founded. It is interesting to note that Graphael expects to sell 70 percent of these systems to large enterprises which already have a CAD system.

This seems to be a new idea, because manufacturers only recently saw a DAO system replacing every drafting board in France, and therefore expected a large market from small enterprises. Apparently, only the large enterprises are aware of the possibilities offered by CAD and DAO, or it may be that the prices are still to high to interest PME (small and medium-sized enterprises).

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ELECTRONICS

PHILIPS, SIEMENS COOPERATIVE RESEARCH AGREEMENT

Paris ELECTRONIQUE ACTUALITES in French 14 Jan 83 p 21

[Unsigned article]

[Text] Philips and Siemens have just signed a long range collaboration agreement for research and development projects in microelectronics (see ELECTRONIQUE ACTUALITES of 17 December 1982).

By the nature of its provisions, this agreement, whose complete details have not yet been released (the two companies feel that such a disclosure would be premature), appears to be an attempt at a European response to American and Japanese research programs of the same type. The two companies are seeking to concentrate their efforts and avoid duplications in order to catch up with their western and Far East competitors in semiconductor manufacturing technologies, and consequently in component technologies.

As part of the signed agreement, Siemens and Philips will jointly form a team of 50 researchers, whose primary mandate will be to study new manufacturing technologies (or improve existing technologies), as well as CAD (computer-aided design) methods. The annual budget of the team will be $3.7 million at first. It will work exclusively on long range projects. In fact, the agreement contains no clause for cooperation on the development of short range products. In particular, any new discovery made by the joint team will be available for competitive exploitation by each of the two companies. The Philips-Siemens agreement covers research in new semiconductor materials, microelectronics, as well as some aspects of submicron technology, CAD, and speech recognition. In France, LEP (Laboratory for Applied Electronics and Physics) is expected to collaborate with Siemens on lithography and super-networks.

The two companies, which are respectively devoting 2.7 and 3.3 billion DM per year to research and development, have each already worked separately on high-resolution microlithography techniques. Until now, Siemens has focused its efforts on X-ray lithography, while Philips has more particularly investigated electron beam engraving methods. It has already obtained interesting results in this area, notably with fast electrons (see ELECTRONIQUE ACTUALITES of 5 November 1982).

In the CAD area, work should be oriented toward the development of general applications software. The topics selected by the two companies for their joint action were those that were already part of national programs for research and development assistance in the two countries (FRG and the Netherlands), as well as part of the broader program of European Community actions. In particular, some of the topics fit squarely in the European strategic program of research and information technology, ESPRIT, launched by the EEC to manage the future of microelectronics in Europe.

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ELECTRONICS

SAGEM TO PRODUCE, MARKET IMI GATE ARRAYS UNDER LICENSE

Paris ELECTRONIQUE ACTUALITES in French 21 Jan 83 pp 1, 15

[Article by JPDM]

[Text] Sagem and International Microcircuits Inc (IMI), one of the large American specialists in top of the line CMOS gate arrays, have just signed a licensing agreement according to which Sagem will be able to customize in France IMI's current and future digital CMOS arrays. This agreement also gives Sagem the exclusive responsibility for selling IMI or IMI-Sagem products in France, as well as in Belgium, Spain, and Italy. Sagem should be ready to customize single-metal layer circuits as early as mid-1983, and two-layer ones by the end of 1983.

Sagem is no stranger to microelectronics: to manufacture thin film hybrid circuits, the company's component department had already acquired CAD, testing, metallization, and engraving facilities. It also had to master micron technologies to manufacture bubble memories. It was therefore logical for the company to seek the exploitation and amortization of these resources with other applications, by customizing gate arrays as an extension of its hybrid circuit activity while meeting the demand of French semiconductor users (including some of Sagem's own departments) for a local service for this type of product.

The selection of IMI is thus easily explained: it has the reputation of offering top of the line CMOS gate arrays, and while its services are rather expensive, they are satisfactory. The range of offered arrays consists of more than 30 models. (The company has already customized 600 circuits since its creation in 1974; it introduced its first silicon-gate circuits in 1979, and its first two metal-layer circuits in 1981. IMI fabricates everything itself, starting with blank silicon slices; its annual turnover is $10 million).

Sagem is actually very familiar with this company, having used its services since 1980.

The agreement announced today is thus a logical consequence of this collaboration. As we have stated, Sagem will be in a position to customize its circuits for the free market, starting with IMI gate arrays, beginning in mid-1983 for single metal-layer circuits, and by the end of 1983 for two metal-layer circuits. These dates correspond to the time needed to install manufacturing lines which will be exact replicas of those at IMI.

The agreement leaves Sagem free both to sign a similar agreement with another gate array company offering complementary products (bipolars or pre-characterized devices, for instance), and to subsequently acquire non-customized array slices from other suppliers than IMI.

The facilities for circuit design, simulation, and verification are already in place at Sagem (built around a VAX and an Applicon system, with IMI and Sagem cell libraries) at the Argenteuil plant. The fabrication will be carried out at the Eragny plant, where all the microelectronics installations already exist.

For the European Market

The agreement reached with IMI stipulates that Sagem will have exclusive rights for selling circuits manufactured by IMI or Sagem in France, Belgium, Spain, and Italy, but the French company will also be able to sell these circuits in all other countries. It will customize all of IMI's CMOS circuits--except for linear circuits--that is, circuits which integrate 70 to 7000 two-input gate-equivalents with gate delays as low as 3 ns. A 10,000-gate model should be announced soon.

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ELECTRONICS R&D PROJECTS, STUDY FOR SUPERCOMPUTER ANNOUNCED

Paris AFP SCIENCES in French 27 Jan 83 pp 1-4

[Unsigned article: "Mr Chevenement Announces the Beginning of Preliminary Studies for a French Supercomputer Project"]

[Text] Paris--On 20 January, during the first workshop of the national committee of the rallying program Mastery of the Development of the Electronics Industry (see AFP-SCIENCES No 320, 29 July 1982, pp 1-3), Jean-Pierre Chevenement, minister of research and industry, announced the launching of feasibility studies for a "large scientific and industrial computer" project.

Among specialists it is well known that the construction of a supercomputer, whose project will be studied jointly by the Ministry of Research and Industry (MRI) and the Ministry of Defense, has periodically stirred the interest of French scientific and military circles for the past five years.

France, as most other countries in fact, does not produce any very large computers, which it must import from the United States. The French market is of several units per year at most, a reason for which the study and industrialization of such machines are not justified in themselves.

But following the dispute between Europe and the United States about the Eurosiberian gas pipeline, the American authorities have dragged their feet on an agreement to deliver two Gray One computers for French scientific research. We might remember that in 1964, the American government had already embargoed a Control Data unit which was to have simulated French nuclear bomb experiments; this decision led General de Gaulle to launch the first computer plan.

The eventual decision to build a French supercomputer for military and scientific purposes will depend on the results of the preliminary study announced by Mr Chevenement. Among interested parties, the total studies are estimated at about 300 MF (million francs). The same source indicates that the actual fabrication would amount to several million francs per unit.

Priorities of the French Electronics Industry

At the same meeting, Mr Chevenement indicated that allocations for R&D in electronics and information technology, which were 6.2 billion francs in 1982, would be increased to nearly 8 billion this year. For the national projects whose study has been approved, the minister added, about 500 MF will be invested immediately, of which 200 MF in public credits, and this effort will be assisted in keeping with the progress of these projects.

Eight projects, Mr Chevenement continued, are currently being prepared:

a) In components, where the requirement for independence is fundamental, efforts must first of all be devoted to a mastery of mask definition, especially for the more complex integrated circuits. That is the objective of the national project Computer Assisted Design of Very Large Scale Integration Circuits.

Also to be mastered are the key components for future consumer applications. That is the role of the Displays national project. In aid of these two major developments, we must combine research forces, as well as avoid as much as possible duplications and unnecessary competition in a scientific field in which "our position is fragile and the stakes are fundamental." CNET (National Center for Telecommunications Studies) and LETI (Electronics and Information Technology Laboratory) must cooperate on the future of MOS technologies; CNRS (National Center for Scientific Research), universities, and CNET, must work on gallium arsenide; and research teams must be combined to achieve a critical mass in the area of passive components.

This program has taken its final shape with the formation of two major pivots: Thomson and Matra, as well as Radiotechnique (Philips subsidiary), which retains a non-negligible role.

Eurotechnique, one of the principal French component manufacturers, had been the subject of long negotiations about its future, because its situation was rather complicated: it is a 51 percent subsidiary of the nationalized group Saint-Gobain, whose information technology activities were cancelled, and 49 percent subsidiary of the American company National Semiconductor (NSC).

The protocol announced by the minister of research and industry stresses the future development of a cooperation between Thomson and NSC on Eurotechnique's present products, and an expansion into other areas. This takeover was paid a symbolic franc to the American company, since Eurotechnique, created in 1979, was not yet earning a profit.

On the other hand, several million dollars have been turned over for a recent renewal of licenses, according to sources close to NSC.

With Matra, Thomson will find itself heading a vast potential in components: EFCIS (Study and Fabrication of Special Integrated Circuits), which performs this activity in the group, employs 14,000 persons and has achieved a turnover of 3.3 billion francs in 1981, with components aimed at professional and consumer needs.

Eurotechnique employs 465 persons in its ultra-modern facilities at Rousset near Aix-en-Provence, whose output is higher than that of NSC.

"This cooperation was difficult, but we now have our two champions, who have the means for reaching a critical mass against international competition," Mr Chevenement estimates.

b) Five national projects are launched in information technology. Three of them involve strategic disciplines for the future development of the French industry: the Software Engineering project, which will make it possible to significantly increase productivity in program writing; the Computer Assisted Design and Manufacturing (CAD/CAM) project, which determines the modernization of our industrial information processing and thus the improvement of productivity in our manufacturing industries; and the Minicomputer Elementary Modules project, which will directly support developments in the information technology industry. It will supply all the sectors of mini and micro data processing with an architecture and components common to the computers of the future. This project will also play a major role in defining by the end of this decade, the computers necessary for French national defense.

In the same spirit, the Ministry of Defense and MRI will jointly study the future Large Scientific and Industrial Computer project. This computer, essentially intended for the army's communications and similar to the American Cry One [in text], will also have to be applicable to civilian industrial and scientific needs, but the market will remain relatively small: about 40 units between now and 1990.

Lastly, two national projects are devoted to new and important information technology applications: Computer Assisted Education, and Computer Assisted Translation.

These actions, the minister indicated, will have to be complemented by a reorganization of public research: INRIA (National Institute for Research on Data Processing and Automation), which plays a large role in France's information technology research, will become even more active in the design of new equipment, and in the implementation of national projects. The other laboratories, notably those of CNRS and universities, will continue the recombinations already underway, and organize other ones.

c) Lastly, a national project will be devoted entirely to Consumer Electronics. It will be complemented by the results obtained in the Display project, and those of the Image Research task force (Messrs Stourtze and False). Unfortunately, "there are few laboratories to rally" in this case, Mr Chevenement declared. There are 25 times fewer researchers in France than in Japan in this field. Research in consumer electronics must be "largely created."

d) Other actions must be conducted in sectors in which, Mr Chevenement emphasized, France's position is already strong. National projects will assist the ambitious equipment already installed by the Ministry of PTT,

notably in Wide Band Networks. The same applies to professional electronics, with the support of the Ministry of Defense. Efforts must be continued in scientific, technical, and medical instrumentation, where "so many possibilities are offered to small dynamic enterprises."

Finally, with the rallying program covering all of research, a smooth interface must be assured with fundamental research.

And Mr Chevenement concluded, "the nation cannot maintain 6500 employees, the current number of researchers in the public laboratories of the electronics industry, without expecting something more than a cultural and scientific fallout. They must cooperate with industrialists and users."

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FRENCH LABORATORIES RESEARCH GALLIUM ARSENIDE DEVICES

Paris L'USINE NOUVELLE in French Jan 83 pp 8-9

[Article by Claude Amalric and Jean Roume]

[Excerpts] Super-fast switching: the Josephson circuit, a superconductor immersed in liquid helium. Another material does it without artifice: gallium arsenide. In fact it can do almost everything. But we barely know how to use it for integrated circuits. Only a few laboratories, among which Thomson's LCR, have obtained significant results.

Recently, the Japanese semiconductor and information technology manufacturers--who often are one and the same--have received a great deal of publicity. Battered by the IBM sting, the prestige of their technology had to be urgently restored. When Hitachi (the first party in the "case") will unveil next year its S-810 supercomputer, capable of performing 630 million operations per second, it will issue more than a challenge: the timing is much too hasty.

And what are we to think of the four megabits of memory that NEC claims it will be able to integrate "within five or six years," when technology has just barely succeeded in mastering the fabrication of 64,000 bit memories, which are 62 times less dense? Not to be left behind, Toshiba promises among other things, to integrate 2400 transistors in a gallium arsenide (GaAs) circuit within a few years, and proclaims it very loudly.

Computation speed, integration, GaAs technology: the Japanese know where to strike. Of these three announcements, and of many others that are currently being made, it is the latter that appears to be the most modest. And yet, it is one of the most important, because GaAs is henceforth recognized as one of the most promising technologies of the near future, despite the difficulties that remain to be overcome for its success. Consequently, all of the world's large laboratories are feverishly working on it.

French Research in Good Standing

Given all these advantages, it is appropriate to ask about the position of French research. The answer is that it is in good standing: practically all the national electronics centers are studying GaAs. At the Thomson-CSF LCR (Central Research Laboratory) for instance, a group of 50 researchers out of the 300 at that location, are successfully working on gallium compounds. The record of 18 picoseconds per gate, obtained in 1982, appears to be still standing, with a consumption of 0.9 mW. "We have been dealing with this material since 1974," explains Gerard Nuzillat, in charge of the department. "Even though GaAs is lagging 15 years behind silicon, we can see that it is making very rapid progress. Until 1980, the integration density has multiplied by three every year." With the Japanese firm Fujitsu, LCR meets the performance claimed by Toshiba. "We have a divider operating at 5.7 gigahertz, the preliminary step toward a 'wafer microprocessor' which will accept a 250 MHz clock. Next year, we will integrate the 3500 elements of a 256 bit memory accessible in 0.9 nanoseconds. If the prospects are realized, we hope to build a 1024-bit memory in the next year." This means 12000 elements grouped in several hundred gates: the cutting edge of progress.

This should assure a brilliant future for GaAs, although at times not as brilliant as claimed. According to scientific estimates and market studies, the share of GaAs in 1990 should not exceed about 15 percent of the integrated circuit market. In any case, it would not replace silicon, which in exchange, it complements very well.

That is because the development of gallium-based technologies is hindered by many limitations. Let us first eliminate the one which appears to be mistakenly proclaimed: the material's rarity. Given the near certainty of not being used for mass-produced batteries, gallium will certainly satisfy technologies that are unimaginable at this point, since the known reserves will suffice for several centuries. More serious are the difficulties of obtaining a crystal of large dimensions without surface defects after polishing. "We are working with two-inch diameter slices; these will soon reach three inches, but then they will remain this size for a long time. But the industry currently uses equipment to process silicon slices of four and even five inches in diameter. It is therefore rather deceptive to stress the analogy between silicon and GaAs processing: the machines are not compatible."

This comment from Max Verdone, scientific leader at Leti (Electronics and Data Processing Laboratory), defines the limits of the comparison and becomes a clear indication of the lag in GaAs. "But based on my experience, I believe strongly in the resources of physics and the imagination of researchers," he adds. This will become useful in reducing the very high cost of the fabricated material, increasing the area of slices, and improving the knowledge and fabrication of super-networks, structures that are very complex for mass production, but which rapidly bring out the best in GaAs. Several months ago, a Hitachi subsidiary claimed to be able to produce large quantities of GaAs squares, 45 mm on one side, of excellent quality and suitable for manufacturing lasers and super-networks, thus superseding a barely preceding announcement by Sumimoto Chemical, world leader in volume.

In France, where Rhone-Poulenc holds a good position in the economical extraction of gallium, all the rather disjointed research on GaAs will henceforth be coordinated by the Ministry of Research and Industry, whether carried out at Cnet (National Center for Telecommunications Studies), CNRS (National Center for Scientific Research), or in universities.

Everything is ready for very high performance French products to be manufactured and marketeted in time.

Gallium, Rare and.... Abundant Metal

According to specialists, the electronic applications of GaAs represent by far the largest market for gallium between 1985 and 1995.

Traditionally, gallium is produced in 4N and 6N quality by units with a capacity of several tons per year, operating in conjunction with plants that transform bauxite into aluminum.

In the fall of 1981, a Rhone-Poulenc-PUK joint company started in Salindres (Gard), a gallium unit of 7 tons per year, using a liquid-liquid extraction process on Bayer liquor.

In one year, this process proved to be competitive since it uses little energy and is non-polluting, unlike the the two processes (carbonation and mercury cells) used so far elsewhere. The development expectations for GaAs are already raising the problem of a two-fold increase.

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THOMSON ASSUMES FULL CONTROL OF EUROTECHNIQUE

Chevenement Announces Takeover

Paris ZERO UN INFORMATIQUE HEBDO in French 24 Jan 83 p 1

[Article by JP]

[Text] Last Thursday, while chairing the first meeting of the national committee of the rallying program Mastery and Development of the Electronics Industry, Jean-Pierre Chevenement announced "the completion of agreements allowing the integratation of Eurotechnique within the Thomson group." The latter begins by acquiring the shares of National Semiconductor (49 percent) for a symbolic franc, and then those of Saint-Gobain (51 percent), who thus definitely leaves the electronic field.

And so, as planned, the French semiconductor industry is reduced to two centers: Thomson and Matra.

A new "components plan" will be announced in the near future, whose goal will be to achieve equilibrium in the French balance of trade within five years. The financial effort in research, development, and industrial investments will amount to 6 billion francs in four years.

The minister also mentioned research and development efforts. In financial terms, the "inducement credits" have gone from 6300 million francs in 1982, to 8000 million in 1983. In terms of "coordination and standardization," the effort is "extended to enterprises and structured within the framework of national projects."

Other Compensations for NS

Paris ELECTRONIQUE ACTUALITES in French 28 Jan 83 p 13

[Article by JPDM]

[Text] Despite the fact that Eurotechnique (manufacturer of integrated circuits formerly 49 percent National Semiconductor and 51 percent Saint-Gobain) has been acquired from NS by Thomson-CSF for a symbolic franc (see ELECTRONIQUE ACTUALITES of 21 January 1983), this company declares itself relatively satisfied with the transaction as far as the interests of NS are concerned (it deplores however, that "the government has made a poor choice for French interests in general").

Indeed, NS points out that the company accepted to sell its shares for a symbolic franc at the request of the government, but that it received monetary compensations (several million dollars) for renewing its licenses to Eurotechnique, and in another non-disclosed form.

It also acknowledges that it received sufficient guarantees from the government regarding the applications acceptance of its present and future products by various government agencies, guarantees which it considers very valuable for the use of its products in France.

Trade Value of About 70 Million Francs

In fact, we are in a position to reveal that NS had to renounce a portion of its compensation which we estimate at about $15 million, in order to obtain these guarantees, a sum which under the circumstances appears to be a duty paid for not being subjected to the consequences of our "protectionism."

Eurotechnique's turnover and losses for 1982 are not public for the time being, because its results are first consolidated with those of Saint-Gobain. However, we estimate that the turnover has been of the order of 70 million francs; the official losses are in any case not significant, since they depend on the manner in which the company's accounts were calculated. (They are probably of several tens of million francs, and not of hundreds of millions, as announced by a daily newspaper). Moreover, Eurotechnique was still in an introductory phase, and profits were not expected before another two years. Under these conditions, why blame it for its losses? Especially since the market is poor and since given the doubts about its future, the company had not received any long term orders for more than six months.

A Eurotechnique Communique

After the announcement of its acquisition by Thomson-CSF, the management of Eurotechnique asked that the following text be published:

"Created about three years ago with a production that started in 1981, Eurotechnique rapidly asserted itself as the European leader in standard mass produced products (sixth largest EPROM producer in the world according to Dataquest). We also should point out that its performance was achieved without the support of a large French electronics group, and that its very rapidly acquired technology allowed it to avoid the purchase of foreign products. The obverse of this success, praised by all, including DIELI (Directorate of Electronics and Data Processing Industry), the largest customers of French and foreign information processing sectors, telecommunications, and the French and German automobile market, has caused it to suffer losses (certainly not hundreds of million francs) which can be considered small in the light of the company's level of industrial production."

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FRENCH PRESS REPORTS ON VISIT TO SIEMENS RESEARCH LABS

Paris COMPOSANTS in French Jul/Aug 82 pp 5-6

[Unsigned article: "Siemens: Nearly 10 Percent of Turnover in Research"]

[Text] In order to respond to recent criticism that assigned the company's success in the past few years to good management rather than creativity, Siemens in May opened its research laboratories of Munich and Erlangen (FRG) to the French press. Indeed, there were those who suggested that the policy of the world's fifth largest electrical industry company has often been characterized by cooperation agreements in many fields, such as microelectronics with AMD and Intel, among other American companies, information technology with Fujitsu (until 1981), office automation with Xerox, robotics with Fujitsu-Fanuc, and so on.

However, a visit of the ultra-modern research facilities at Munich and Erlangen, clearly shows that innovation is increasingly the key of Siemens' strategy. This is confirmed by a few significant figures.

Of Siemens' worldwide turnover (more than 3 billion DM), 9.6 percent is already allocated to research and development, making it the third largest in the world in terms of percentage, among the leaders of electrical and electronic manufacturing: behind Western Electric (11 percent) and Sperry Rand (10.2 percent), but ahead of ITT (8.2 percent), Philips (7.5 percent), AEG, Westinghouse, General Electric, and IBM. At Siemens, these R&D activities employ more than 30,000 persons throughout the world, which has made it possible to increase the turnover contribution of products less than five years old from 42 percent to 49 percent between 1972 and 1981. At Munich and Erlangen, the major portion of the research effort is concentrated on superconductivity, nuclear magnetic resonance, plasma physics, fuel cells, microelectronics, and optical fiber transmission.

The use of superconducting excitation windings in large turbogenerators makes it possible to significantly increase their capabilities and output. In the laboratory, Siemens is studying a superconducting generator with a power of 2000 MVA, which would be built by KWU, a Siemens subsidiary which is the world's third largest builder of power plants; a demonstration rotor using superconductivity should be shown in 1984.

As a radiology process now reaching maturity, but studied for some ten years, nuclear magnetic resonance provides medical diagnosis with an enormous advantage over conventional radiology: it makes it possible to detect the nature of human tissues without irradiation. Siemens is getting ready to soon market such a system.

One of the most spectacular phenomena to be seen in the Siemens laboratories is the stroboscopic, sweep electron microspcope display of waves propagating at about 4000 m/s on the surface of piezoelectric crystals such as quartz and lithium niobate. The image shows perturbations resulting from material defects, reflection, or diffraction outside of the normal wave. These acoustic waves can also be used for bandpass filters, delay lines, and so on.

The process, requiring a sweep electron microscope, also makes it possible to test components by displaying voltage differences of 1 mV over 1 micron, with response times of 1 ns.

The objectives of microelectronics research are to reduce dimensions so as to reach the VHSIC (very high speed integrated circuit) stage after VLSI's (very large scale integration). By 1985, Siemens expects to achieve 40 sq-mm VLSI chips (from the current 35 sq-mm) with minimum geometries of 1 micron obtained on silicon wafers of 150 mm in diameter (from the current 100 mm).

In optical fiber transmission, Siemens is conducting research at three wavelengths (850, 1300, and 1600 nm), and is developing star couplers, buses, and multiplexers/demultiplexers. For instance, a two-channel multiplexer makes it possible to simultaneously transmit two signals at two different wavelengths on the same optical fiber. The first tests were completed with a signal separation of 70 nm; in the case of two channels with two multiplexers, the total insertion loss was 4 dB with a maximum attenuation of 30 dB between the two channels for single direction transmission; in a bidirectional mode, the best result obtained was 60 dB. In its laboratories, Siemens is also developing an optical fiber interferometer for navigation systems, which should evolve toward better resolution, precision, and dynamic operation, as well as toward miniaturization through the use of directional couplers or integrated optics.

These few examples disclose a small portion of the topics being examined at the Siemens research laboratories. It would be impossible to write an exhaustive report for a company which produces semiconductors as well as large electrical machinery, or simple relays and complex process controls, in other words, the entire gamut of electrical and electronic manufacturing, from a wall plug to nuclear power plants.

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BRIEFS

COMPUTER-RESEARCH LABORATORY ESTABLISHED—Finland has acquired a special computer-technology laboratory. It has been in operation since the beginning of this year in Oulu as part of the information-technology research program at the State Technical Research Center (VTT). "There is a need for a special unit like this so that we may be capable of properly responding to the growing demand for research and development services," said Samuli Saukkonen, the director of the computer-technology laboratory. The computer-technology laboratory got its personnel and its first project "as transfers" from the VTT electronics laboratory, which also operates in Oulu. The new research unit's field of operations covers the entire ranges of small and microcomputer equipment, systems and supplies as well as those of production techniques. "We offer services relating to our field of operations to industry throughout the country," Saukkonen said. They predict that the strong demand and the need for research in the field will require the rapid growth of the laboratory. "Thus our personnel of seven will probably increase to one with a staff of 30 by as early to the end of the year," Saukkonen believes. The VTT's sales volume for computer-technology research last year was over 6 million markkas. The chief goal of this research is to advance the industry's ability to compete. [Text] [Helsinki UUSI SUOMI in Finnish 4 Mar 83 p 7] 11466

CSO: 3698/[illegible]

UK ROBOTICS: STATUS, GOVERNMENT AID PLANNED

Frankfurt Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT in German
9 Mar 83 p 5

[Article: "British Government Will Support Robot Building"]

[Text] J. Rh. London, March 8. "Automate or liquidate--" someone found this odd slogan some time ago and brought it to public attention. In recent times this battle cry has not pertained so much to the automating of entire assembly lines and large chemical process facilities as it has to the application of robots. In this field, British industry has not exactly been in the vanguard. Among the industrial countries they are about half way up and a long way behind the leaders: At the end of last year, 13,000 robots were in use in Japan; 6,250 in the United States; 3,500 in the FRG; 1,300 in Sweden and 1,152 in England. Further down are France with 950, Italy with 700 and Belgium with 350. Other Western countries together employ 1,200 of these agile helpers. In this regard, one must remember that the Japanese use a broad definition of the word "robot."

It is true that England had an increase of 61 percent in the number of installed robots last year, but that amounted to only 439 units. In the FRG, 1,200 new installations were made; in the United States, about 1,500 and in Japan, 3,000. With regard to the number of old installations and the ones added last year, England is both absolutely and relatively--on a per capita basis--behind the FRG and way behind Japan.

One does not have to search far to find the causes for England's plight. It is the general relative regression of the British economy, marked by low investment over a number of years. The endless intervention of governmental bureaus in the economy under previous regimes, which again and again injected new cycles of stop-and-go policy, made industry wary of investing in research and development as well as in machines and facilities. The inhibition in both areas means that the robot concept was impeded in a twofold sense in England.

In the British Ministry of Industry it is hoped that this will now change and that last year's 60-percent growth rate will be repeated this year from a significantly higher starting point. With growing use of robots, continuous advertising of their merits and substantial government funds for motivating

inhibited businesses, prospects have improved for a somewhat more spirited activity in installing robots. The necessity of lowering personnel costs is often not the only or not even the real reason for installing robots. Health dangers of a certain work process, higher material consumption or better quality of product can just as well be the reason. For such reasons, two robots were installed several years ago for spraying large kitchen range parts in factory of TI Creda Limited, a subsidiary of Tube Investments PLC. Previously the parts had been dipped. In this process, a considerable quantity of the expensive glass enamel was trapped in recessions and accumulated on projects, resulting in a loss of the expensive glass enamel. It is reported that this material loss problem has been solved, the enamel coating is much more uniform, the number of defective parts has been halved, and that the workers have been relieved of a physically taxing job. The three men who previously did this job are still involved in the process, but are engaged in other tasks.

In 1979 the two robots from Hall Automation cost about 36,000 pounds and the conveyor about 8,000 pounds. No saving was made in personnel costs, but the added capital cost was made up by material savings. And a higher quality product was produced. Today of course the same robot with its movable shoulder, elbow and wrist would cost 50,000 pounds or almost DM 200,000: that is, about 3 times as much. But on the other hand, material is no longer as cheap as it was then.

Many jobs will have to be taken over by robots because they are physically taxing or dangerous. Stacking sacks on a pallette is a hard job for humans; a robot can lift the sacks with a suction gripper. When spraying the bottom of automobiles, a worker has to wear protective clothing. Continuously refeshing the air in a spraying cell costs a lot of energy. Repairing the insides of a nuclear reactor is dangerous work. Wiring automatic machines is very tiring activity. British Leyland, the nationalized auto producer, has developed a "sniffing robot" whose task is to find leaks in automobile chassis without using water. The robot sniffs at the likely places and its computer marks the location of leaks on plan-view and side-view drawings.

Of the 1,150 robots now installed in England, about 35 percent are employed in welding, 15 percent with injection molding, just under 11 percent with painting, just under 10 percent with attending machine tools, and the remainder are involved with other tasks such as grinding, assembling, die casting, attending presses, stacking, inspection and forging. Few objections to using robots are heard from the unions. Frequently, robots do not eliminate jobs, but instead secure them. Cases are known wherein companies, for example a supplier for the automobile industry, had to turn to robots to keep from losing a large part of their business in the face of stringent demands on quality and reliability.

Further technical development is, among other things, directed at enabling robots to recognize and classify various anomalous situations, for example, when feeding parts, to neglect parts smaller than a specified size. For accomplishing such tasks, they are more and more frequently being equipped with sensors.

As for sales, last year the 10 British manufacturers of robots did not top a sales figure of 10 million pounds in producing 150 to 170 robots and providing tools and installation. The largest of these is the American-based Unimation (Europe) Ltd. in Telford/Shropshire which has increased its production to nearly 150 robots per year. The most important purely British firm is Hall Automation, a subsidiary of General Electric. Several companies have agreements with Japanese companies under which they sell or produce Japanese robots with the intention of one day developing from these a line of their own products.

For the government, all of this is not happening fast enough. Thus it has promulgated a program with funds for application studies, investment aid and grants for companies which would like to develop and produce robots. The responsibile state secretary labels the program "a great opportunity." However, experience from other fields and similar circumstances says there is no better support than a strong upswing in business with active demand for investment goods.

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SCIENCE POLICY

FRENCH ASSESS RECENT R & D EFFORTS AS GENERALLY SUCCESSFUL

Paris AFP SCIENCES in French 17 Feb 83 pp 1-5

[Text] Sophia-Antipolis, 1 year after the national research and technology colloquium. The approximately 300 officials and people involved in research gave a "generally positive" assessment to the administration's policy on research and technology at the "Sophia-Antipolis meetings," held on 14 and 15 February at the scientific campus of Valbonne, near Nice.

Actually, based on the listing cited at the meetings of the legislative actions taken over the past year (the orientation and programming law, reform of major research organizations, the establishment of new structures for the MRI [Ministry of Research and Industry], etc.), the strong upturn in R & D budgets, and projects now being carried out, the record seems quite impressive.

The minister of research and industry, Jean-Pierre Chevenement, presented a striking picture of the work now underway (details are given later in this article). Some of his colleagues who are entrusted with major missions at the ministry, including Roland Morin, director general of scientific and technological research, Robert Chabbal, head of the science and technology mission, and Roger Lesgards, wholeheartedly agreed.

Mr Chabbal reported that the mission he heads is working on the preparation of a scientific and technical masterplan, which will be a flexible plan covering a 4-year period. It will include an inventory of all the nation's scientific and technical resources, and will also serve as a tool to stimulate dialogue between all the partners involved.

This masterplan will provide a basis for preparing budgets for research and development.

But in terms of the regions, while there is a growing realization of the decisive role which research and development must play in the nation's life (an illustration of this is the creation of research associations of all sorts, acting in liaison with the ADEMAST [National Association for the Development and Mastery of Science and Technology]), the practical and concrete spinoffs of this national research policy are still only few in number. This became quite apparent when the regional representatives spoke.

The time factor certainly has something to do with this. As a representative from the Languedoc-Roussillon area said, "a year isn't long enough to produce any major changes in behavior."

Moreover, even if new ideas have been included in legal texts--but certainly not all the new ideas, and this is true particularly for scientific and technological advisory services--transformations which require money to be put into practice have not kept pace with the principles established. And the economic crisis isn't making things any easier.

The total of the regional research budgets for research and development did greatly increase during the last 3 years (74 million francs in 1980, 147 million in 1981, and 218 million francs in 1982). But these figures are still well below the real needs of the regions in this field.

The Sophia-Antipolis meetings revealed the extreme diversity of the situation in France, based on specific examples. Some regions have not yet managed to grasp fully the extent of the scientific and technical potential they do possess and the way it could be put to use, while others, such as the Rhone-Alpes area, have been involved in research and development on a large scale for years.

Research-university relations gave rise to intense or even heated debates. Bernard Descomps, director of research at the ministry of national education, pointed to the gap between the potential and the objectives of higher education institutions. This potential is truly enormous, since there are 43,000 teachers/scientists and 20,000 research technicians working in 5,000 laboratories. This potential equals the potential of all the public research organizations in France.

During the opening sessions Francois Gros, adviser to the prime minister for scientific issues and president of the ADEMAST, asked that the report on the year which has just elapsed since the national colloquium be given without excessive indulgence,

but also without an overly critical spirit. "Neither arrogance nor gloom," he added. The Sophia-Antipolis meetings were conducted in the atmosphere he called for.

Mr Chevenement's Speech at the Colloquium

In his lengthy speech at the colloquium's closing sessions, Jean-Pierre Chevenement, the minister of research and industry, after pointing out that the "Sophia-Antipolis meetings were not held to rekindle a flame," but rather to "modestly prepare a first report, to study the first lessons, to enrich our actions by comparing our first experiments, to make sure that the rudder and sails are well on course, and if necessary, to make the maneuvers required to speed up the pace," did in fact present a broad panoramic description of the work in progress on the reorganization of French research, the results that have been achieved, and the problems now arising.

First of all, programming and budgets.

The first estimates, which are still provisional in nature, show that "in 1982 we achieved a level slightly above 2.10 percent. We are climbing the steep slope leading to our objective of 2.5 percent of the PIB [Gross Domestic Product] for our DNRD [National Spending on Research and Development]. We started from 1.8 percent in 1980. Now in the middle of the period, we are exactly at midstream of our course."

This growth has been made possible through the strong increase in the civilian research budget.

"The effort will be continued in 1983." The growth planned for the civilian budget is 17.8 percent, based on an average percentage stipulated by the law. "It is likely that this percentage will be slightly reduced because of budget cutbacks, whose extent has not yet been determined."

The minister indicated that he had obtained the prime minister's agreement that "a special procedure and preferential treatment" will be granted to research. "We are going to clarify this over the next few weeks. This means that the figures mentioned by some newspapers in recent days do not correspond to reality."

The minister requested that spending on international commitments, program support, and support for mobilizing programs be maintained, in any event. These sectors should be spared from budget cutbacks.

Jobs. With the percentage of 4.5 percent for job creation, nearly 5,000 new jobs were created in 1981 and 1982. Another 2,500 will be created in 1983. (It was reported elsewhere that in 1983 the job creation rate will be 4.3 percent).

Organizational reform. This reform "has become a reality." The EPA [Autonomous Public Facilities?] such as the CNRS [National Center for Scientific Research], the INSERM [National Institute of Health and Medical Research], the INRA [French Institute for Agronomical Research], the ORSTOM [Overseas Scientific and Technical Research Office], along with some others, will be changed into EPST [Scientific and Technical Public Facilities] within the next few weeks, as soon as the CSRT [Research and Technology Council], which is to issue an opinion on this matter, has held its first meeting.

This meeting is scheduled for 3 March. An entire day will probably be needed for the first session. The minister plans to submit to the council a number of important reports and he expects to receive enlightened and informative opinions and advice from this "little research parliament."

On the subject of personnel regulations, the minister indicated that "their preparation was well advanced." An interministerial cooperation program has been set up, and four working groups, dealing with retirement conditions, evaluation procedures for ITA [expansion unknown], training, and mobility, have brought together government officials and union representatives to work on the major issues. This sort of cooperation will be expanded to the entire program and will continue throughout March. "Our goal," said the minister, "is to produce a definitive text by the end of the first quarter of this year."

Training by research and for research "has also seen some new developments." In 1982 100 complementary research allocations were established. The MIDIST [Interministerial Mission on Scientific and Technical Information] has developed a complementary allocation to enable students to improve their documentation and information. The CIFRE [expansion unknown] fellowships have been increased from 50 to 156 (these are industrial contracts for training by means of research programs).

The GIP [Public Interest Groups]. There are 60 projects for public interest groups now being considered. Industry is involved in 50 percent of these cases. A decree will be issued

within the next few weeks to give these GIP a definitive financial status as flexible as possible under French law. A circular will accompany this decree, stating the way these GIP will be used.

Regional developments. According to the minister "the regions must be the source of initiative, proposals, new ideas, original designs, but it is essential that their activities develop consistently with national policy."

The regions must set priorities, and establish carefully the regional technical poles specified by law, based on their specific functions and resources.

The "relative scarcity of regional financial resources requires that a careful evaluation be made of their projects and proposals."

The minister announced "the preparation, under the 9th plan, of 'state-region' contracts." "Based on the recommendations made by the prime minister, the minister of research and industry, acting in liaison with the ministry of planning and territorial development, will inform the regional commissioners of the priority objectives of the research and technological development policy. These objectives will be set in terms of programs (such as mobilizing programs and applied and finalized reseach programs)."

For some of them, a regionalized translation will be undertaken. This will be done, for instance, in the areas of biotechnologies, electronics, production methods, materials, food processing, etc.

At the same time, the regions will prepare their first reports. As soon as the regional advisory committees for research and technology are in place (the decree should be issued at any time now) and have received the regional proposals, the content of these proposals may be examined by the region and the MRI.

The MRI and the DATER [Delegation in Charge of National Development and Regional Action?] will organize a working session in a few days in order to determine the working relations between the MRI and the regions.

Technical research centers. The minister wants to give them a new life, new missions, so that they will truly become collective research centers, which the PME [Small and Medium Business Enterprises] greatly need. That is why he will soon begin consultations on these centers with all the interested parties,

such as professional organizations, union groups, and research laboratories. The objective of these consultations "will be to begin their reform, which is to be included in the bill on France's industrial development now being prepared by the MRI, as part of the national plan for industry."

What sort of spirit is guiding the reform of these technical centers? A clearer definition of their missions. These centers, in addition to research, should be able to conduct activities such as training, technical assistance, standardization, technical control, and technological dissemination. They should become more oriented toward the outside.

On the subject of their resources, which now come from parafiscal revenue, the minister believes "that it is abnormal for technical research to be financed solely by national production and not at all by the sector which deals in sales or imports."

In conclusion, the minister said that "the stage is now set." "The actors have rehearsed their roles. The ship has left the port, and it is solidly built. Its crew is experienced. Now it must face the high seas and reach its cruising speed, realizing that we will not be always sailing on smooth seas. The world we live in now is being shaken by strong tempests. To emerge from today's crisis we must invent a new model for development."

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SCIENCE POLICY

NATIONAL ASSEMBLIES TO DETERMINE INDUSTRIAL POLICY

Paris AFP SCIENCES in French 3 Feb 83 p 5

[Unsigned article: "Coordination Committee of the National Assembly for Industry"]

[Text] Two industrialists, Jean Riboud, president of Schlumberger, and Pierre Eelsen, general representative of Renault, will chair the Coordination Committee of the National Assembly for Industry, which will be held on 27, 28, and 29 June 1983 in Paris.

The commitee will head the 12 workshops which will consider the following four topics: win the industrial battle on an international scale, work together, break down partitions in industry and its environment, and create a competitive industry. One-half of these workshops will be chaired by industrialists.

At the same time, the national assembly will be preceded by 10 preliminary events which will examine in greater depth and expand the discussions opened in October 1982 at the workshops organized in Paris. The first of these events will be held on 14 and 15 February at Sofia Antipolis, on the topic Research and Industry.

Other decentralized meetings will be organized in all regions on the role of PMI (small and medium-sized industries) in regional development.

Finally, workshops involving management and personnel will be conducted at several plants of nationalized enterprises.

A publicity drive aimed at changing the French public's image of industry will also be carried out.

It should be pointed out that these concerted actions will result in a legislation draft for France's industrial development, integrated in the second plan law presented to Parliament next fall.

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SCIENCE POLICY

CENTER FOR STUDY OF ADVANCED SYSTEMS, TECHNOLOGIES TAKES SHAPE

Paris AFP SCIENCES in French 24 Feb 83 pp 1-2

[Text] Paris. The CESTA [Center for the Study of Advanced Systems and Technologies] is now taking shape. The decree listing its missions and structures was published in the JOURNAL OFFICIEL on 23 February. The CESTA, created as a result of an interministerial decision of 18 January 1982, has been gradually set up. It is operating in the former buildings of the Polytechnical School at the Montagne Sainte-Genevieve. It is being run by an interim delegation headed by Jacques Robin.

The CESTA has been given a legal status as flexible as possible. It is an EPIC [Industrial and Commercial Public Facility], and it is under the supervision of the minister of research. Its purpose will be to "contribute to the understanding of innovation, particularly the relations between developments in sciences, technology, and society."

The CESTA's missions will include:

a. To increase the knowledge of complex systems, the evaluation and dissemination of advanced technologies.

b. To study the impact of new technologies on traditional industries and services.

c. To evaluate the economic, social, and cultural repercussions of technology on the lives of individuals, organizations, and societies.

For these purposes, the center has the responsibility to:

1. Conduct or encourage studies and research in order to form a source of documentation and make available to interested parties an international documentation system.

2. Help organizations, communities, and businesses, and any interested ministerial departments with their planning, evaluations, technological decisions, and with their strategy for innovation.

3. Organize activities to promote awareness and training, aimed primarily at industrialists, union members, scientists, and government officials.

4. Organize meetings or activities and provide technical support for qualified associations in the area of the advancement of science and technology.

The center may form associations by contract with other French or foreign centers.

In terms of its structures, the CESTA will be directed by a board of directors, headed by a chairman assisted by a director general. Pierre Chavance, the P-DG [Chief Executive Officer] of CIT-Alcatel, was appointed chairman on 23 February.

The center will also have a scientific, technical, and cultural collegial body. The head of this body will probably be Francois Gros, adviser to the prime minister for scientific issues.

The provisional structures of the CESTA include:

a. management and administrative organizations:

1.	delegate general	Jacques Robin
2.	mission director	Michel Demazure
3.	secretary general	Martine Berge

b. two operational poles:

1. The IPSPT [Scientific and Technological Planning Institute]. Its director is Yves Stourdze.

2. The GEACT [Technological Choices Study and Assistance Group]. Its director is Francois de Lavergne.

c. operational services. These include: study services, budget-programming, conferences, foreign relations.

The CESTA will provide significant support for the ADEMAST [National Association for the Development and Mastery of Science and Technology]. In addition to providing office facilities and

personnel, the CESTA will also help ADEMAST with its technical expertise. The ADEMAST will help the CESTA to maintain close ties with the most vital elements in scientific and technical development and with the users of these developments.

Biography of Mr Chavance

Pierre Chavance, chairman of the CESTA's board of directors, was born on 19 April at Laignes (Cote d'Or department). He studied at the Polytechnical School and at the National Superior Institute. From 1948 to 1954 Mr Chavance was a research engineer at the CNET [National Telecommunications Research Center], then he was director of the telecommunications department at the French Thomson-Houston Company, from 1955 to 1970.

From 1970 to 1972 he served as Thomson-CSF's general technical director. He then joined the CGE [General Electric Company], where he served in turn as deputy director general of Alsthom, from 1974 to 1976, and as director of development, from 1976 to 1982. Since 1979, he has also been deputy director general of the CGE. On 16 June 1982 he was appointed administrator-director general of CIT-Alcatel and chairman of Alcatel Electronics.

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SCIENCE POLICY

ITALIAN NATIONAL RESEARCH COUNCIL ACTIVITIES DISCUSSED

Rome NOTIZIARIO DELL'ENEA in Italian Sep-Oct 82 pp 34-39

[Article: "CNR Role From Research To Innovation"]

[Excerpts] "In Italy, the most important diversified public scientific network, alongside that of the universities, consists of the Institutes and Centers of the CNR [National Research Council], which, in the historical evolution of Italian scientific and technological research, has played a central role that it must not and cannot be permitted to lose. This role has been that of a fundamental element in technological innovation, and hence one of the most important factors in productiveness and economic and social growth."

This is a significant passage from--because it synthesizes the "spirit" of--the "General Report On the Status of Scientific and Technological Research in Italy for 1982" submitted on 30 September by CNR's president, Prof Ernesto Quagliariello, to the Plenary Assembly of CNR Committees before forwarding it to the CIPE [Interministerial Committee for Economic Planning]. The CIPE must enunciate its own views regarding the general policy lines contained in the report, and must take them into account in arriving at its decisions on the problems and program recommendations set forth in the report.

Among the legislative and financial provisions that could impart a real forward thrust to the research and innovational programs, the CNR report cites recent Law 46 titled "Support Measures for Sectors of the Economy of National Scope," the refinancing of the IMI [Italian Credit Institute] Special Fund for Applied Research (1,700 billion lire for the 1982-1983 biennium), and the institution of the Ministry of Industry's Special Revolving Fund for Technological Innovation, with a funding of 1,500 billion lire for the 1981-1983 triennium. The CIPE has designated five industrial sectors to receive these fundings: Automotive and components, electronics, fine chemicals, aeronautics, and steelmaking. Appropriations totaling 3,000 billion lire over a 5-year period are planned for the implementation of the National Energy Research Plan, which coordinates the activities of the CNR, ENEA [National Committee for Research and Development of Nuclear and Alternative Energies], ENEL [National Electric Power Agency], ENI [National Hydrocarbons Agency], and INFN [National Institute for Nuclear Physics]. Another 1,000 billion

lire, over the same 5-year period, are to be allocated to the National Space Plan, which the CIPE entrusted to the CNR on 25 March last year. Further funding is being allocated to the farming sector and by the Institutive Law on the National Public Health Service.

In its meeting of 27 May 1982, the CIPE authorized the CNR to proceed with the drawing up of seven projects grouped within the fields of Economics, Agriculture, Advanced Technologies, and Human Health. These projects, for which, for the first time, "research contracts" were brought into being as the new instrument provided by Law 46 for the financing of applied research, address in particular: Structure and evolution of the Italian economy, increased productivity of agricultural resources, genetic engineering and molecular bases of genetic diseases, preventive and rehabilitative medicine, control of diseases of infective origin, biomedical and sanitary technologies, and mechanical technologies. The new projects, particularly the one relative to the Italian economy and "Energetics 2," position the CNR as Italy's international interlocutor on the major issues of unemployment and energy, the central problems of the international community over the next 10 years.

Resources for Research in Italy

The real increase in expenditures for research during the period 1967-1980 (at 1970 prices) was, taken as a whole, 70.5 percent, with an average annual increase of 7.3 percent until 1972, and of 3.6 percent from 1972 to 1980. The increase in 1981, for which year the CNR report was able to cite only the expenditure forecast figures, should amount to around 26 percent over 1980. This increase is attributable mainly to the University, the CNEN (now ENEA and the CNR. The ratio of R & D _research and development_ expenditures to GDP _gross domestic product_ from 1967 to 1980 was 0.9 percent, while for 1981, owing to zero growth of the GDP versus an increased commitment to research, this ratio should be around 1.08 percent. Referring still to the period 1967-1980, the increase in R & D expenditures was substantial, on the part of both the government and the enterprises, with increments of 43 percent and 99 percent respectively. As for financing, the government covered, on average, 48.2 percent of the total, and the enterprises 50 percent. The public sector, therefore, finances also a part of the research done by the enterprises, which have received funds in growing amounts over the years. From a modest quota of 1.7 percent of all public financing in 1967, the enterprises gradually came to receive an 8.5-percent share in 1980, which is indicative of the continually growing interest being shown by the state in industrial research. For the period under examination, financing from foreign sources, oscillating around 1.8 percent, must also be added in.

For 1982, R & D expenditures by the government and enterprises should amount to 5,363 billion lire, with an increase of 22.8 percent in monetary terms over 1981 (allowing headroom of 17 percent for inflation). A further breakdown shows an increase of 27.1 percent in appropriations in the case of partly-state-owned enterprises, and 28.2 percent in that of the private enterprises. The enterprises are planning to commit larger financial resources than in 1981, to which must be added the public financing of industrial

research through the IMI Fund. In the public sector, the Ministry of Public Instruction accounts for the largest share of the expenditures with allocations amounting to 29.1 percent, followed by the ENEA with 26.8 percent, and the Fund for Southern Italy with 9.4 percent. The Defense Ministry and the CNR, on the other hand, have experienced a sharp drop in their appropriations. In the case of the CNR, it is the state's regular contribution that has been reduced. In the sectoral breakdown by disciplines, only the physical sciences and nuclear research activity have been subjected to reduced funding. Funds for biological and medical research, the agrarian sciences, and engineering and technological research, on the other hand, have been increased.

Professor Quagliariello's report provides a detailed analysis of scientific personnel staffing in 1982. The national institutions employ a total of 87,589 persons: Specifically, researchers number 41,716, of which 23,191 are employed in the public sector, 6,194 in ENEL and the partly-state-owned enterprises, and 12,331 in the private sector. The increase in the public sector's personnel, over 1981, is owing mainly to the expansion in university-trained personnel and only minimally to a more suitable distribution of the personnel of the Higher Institute of Health and Sanitation and of the Defense Ministry. The CNR's researchers number 2,101.

In conclusion, the CNR document sets forth the CNR expenditures projection for 1982, pointing out how the the reduced state contribution, less than 40 billion lire, "has had a marked impact on the promotion of research. In fact, financial interventions by the CNR Committees in support of research show a drop in monetary resources of 5.5 percent from the levels of the preceding year." To the first-generation End-Use Projects still in progress, because they were begun after those that were completed in 1981, will be added the seven approved by the CIPE last May, for which 5-year funding requirements have been projected at 282,204 million lire. In 1981, public funding for national space programs totaled 38 billion lire, while that for international programs came to 70 billion lire. The updated National Space Plan this year calls for projected expenditures of 513 billion lire for the period 1982-1986, with a subsequent increase of 108 billion lire beyond 1986, for an overall total of 660 billion lire.

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RENAULT'S RESEARCH AUTOMOBILES DESCRIBED

Eve: Sleek, Efficient

Duesseldorf VDI NACHRICHTEN in German 5 Nov 82 p 27

[Article by Olaf von Fersen: "Eve Makes Optimum Use of Fuel without Shifting--The Car of Tomorrow: Research Renault Has No-shift Power Transmission"]

[Text] The "Eve" research car of Regie Renault came about upon proposal of and with assistance from the Energy Ministry. The full name concealed by the abbreviation is "Elements pour une voiture econome" [Elements for an Economical Vehicle] and shows that the project involves improvements in various fields which specifically are to be useful and suitable for series production. Eve roughly has the size of the Renault 18 series-produced model and is a roomy, four-door, middle-category limousine with adequate trunk space. The project has two definite main points: Reduction of air resistance and improvement in engine efficiency.

The possibilities of reducing the empty weight were used in the Renault Eve research passenger car only to the extent that they can be implemented in the foreseeable future also through series production. To be sure, light-weight metal and synthetic materials were increasingly used as raw materials, along with glass of reduced thickness, but only to the extent to which the costs had to remain practically within the spread of series-production calculations. Through the increased use of light-weight metal, it would have been possible to save more than 50 kg in weight in the engine alone. But since the project did not include this kind of increase, an engine available in the production program was used for Eve; this is a modified 1,108 cm^3 four-cylinder engine with grey-casting cylinder block and a capacity of 39 kw, such as it is used in the model program of the "5" series put out by the company. Very little was changed in the engine itself and that was quite deliberate in order first of all to investigate the effect of the reduction of air and rolling resistances as well as the function and efficiency of the new type of power transmission.

The research vehicle is a little bit bigger than the Renault 18 and also has more inside space. A comparison of the individual dimensions shows that, with the series-produced model figures being given in parentheses: Wheel base

2,509 mm (2,441 mm); gauges 1,415 mm/1,368 mm (1,415 mm/1,355 mm); length 4,408 mm (4,381 mm); width 1,740 mm (1,689 mm); on the other hand Eve is 75 kg lighter with a weight of 845 kg (920 kg). Work on the more streamlined body began with the development of a considerable number of designs of which several were checked out as 1:5 models in the wind tunnel. The best shape was then converted to a sacle of 1:1 for further optimization. In making the selection, by the way, it was not just the aerodynamic qualities that were decisive; the available useful space, the visibility conditions, and pure esthetic aspects also played equivalent roles.

Although the body's profile surface turned out to be 4 percent bigger than in the series-produced model the extraordinarily good c_W value of 0.239 (0.39) on the whole resulted in a considerable reduction in the overall air resistance amounting to almost 37 percent.

The power concept starts with the idea of running the engine as much as possible steadily in the range of its best efficiency. This almost naturally presupposes no-shift power transmission. Renault engineers selected the Van Doorne "Transmatic" where a thrust [shift] member belt made of metal runs between conical disc pairs. The change in the interval between the double discs allows the belt to run over a variable radius. This gear guarantees a very wide transmission or reduction range and makes it possible to run the engine at higher driving speeds with greatly reduced rpm. Engine rpm, choke valve position, and gear reduction are controlled automatically by means of a microprocessor. The driver's foot pedal here is no longer mechanically connected with the choke valve but merely passes on the particular driver's decision to the electronic control instrument which then, with the help of electrical adjusting members, controls the engine and the gears in such a manner that the desired performance is attained always with the widest possible open choke valve and the smallest possible crankshaft rpm.

The possibilities of no-shift automatic power systems become clear already through the range of driving speeds which exists at an engine rpm of 1,000 min^{-1}: 8 km/hr up to 45 km/hr. Investigations concerning a driving speed of 120 km/hr--which in the case of Eve would correspond to an output requirement of 15 kw--resulted in the following rpm/consumption values: 2,000 min^{-1}/4.78 lit/hr; 3,500 min^{-1}/5.62 lit/hr (+ 18percent); 5,000 min^{-1}/6.97 lit/hr (+ 46 percent). Illustrating the connection between the rpm, the output, and the consumption in one performance graph was used by the experts in the dashboard dials.

Consumption Shown on Video Screen

In addition to the central digital indication of the driving speed, the dashboard contains two novel instruments: On the left, the engine consumption graph on which a moving luminous point indicates the particular output in the consumption graph over the rpm. The right scale shows the consumption as a function of the driving speeds. Here again this is done by means of a moving luminous point.

In the next step in this project, the engineers at Regie Renault want to look into the engines. The efficiency of the subsystems is to be increased with the help of novel combustion methods.

A design investigated at the time pursued the goal of energy recovery during vehicle braking and a similar variant is being considered for the engine-gear management, similar to the one that was already put into the Mercedes-Benz research car (see VDI-NACHRICHTEN No 42, 82): Possibility of choice between differing, typical engine types with the objectives of consumption minimizing in superhighway traffic, reduction of harmful substance emission during city driving, and reduction of noise level during city driving at night.

The electronic control of engine and gear operation, determined by performance graphs, in the case of no-shift power transmission is certainly the most promising concept for optimum economical drive. Considering the present state of component development, a solution ready for series production is certainly no longer utopian.

Comparison of Technical Data

			Renault 18	Renault Eve
1	Motor-Hubraum	[cm³]	1397	1108
2	Leistung	[kW]	47	39
3	bei Drehzahl	[min⁻¹]	5500	5500
4	max. Drehmoment	[Nm]	103	81
5	bei Drehzahl	[min⁻¹]	3000	3000
6	Leergewicht	[kg]	920	845
	Luftwiderstandsfläche (c_wxF)	[m²]	0,728	0,446
7	Höchstgeschwindigkeit	[km/h]	150	157
8	Beschleunigung 0-100 km/h	[s]	17,1	18,3
9	Verbrauch auf 100 km	[l]		
10	bei 90 km/h		6,0	4,1
11	bei 120 km/h		7,8	5,5
12	Stadtzyklus		8,6	6,6
13	Dritteimix		7,5	5,4

Key: 1--Engine stroke volume; 2--Output; 3--At rpm; 4--Maximum torque; 5--Empty weight; 6--Air resistance surface (c_WxF); 7--Maximum speed; 8--Acceleration, 0-100 km/hr; 9--Consumption per 100 km; 10--At 90 km/hr; 11--At 120 km/hr; 12--City driving; 13--Thirds mix.

The concept of the Eve experimental car by Renault (the photo shows a model) is an entirely realistically designed utility vehicle.

Vesta: High Mileage

Duesseldorf VDI NACHRICHTEN in German 5 Nov 82 p 27

[Article by O. v. F.: "Driving 100 km with 3 Lit Fuel"]

[Text] With 50-percent financial assistance from the French Industry Ministry, Regie Renault, in addition to the "Eve" project, created a second experimental and research vehicle which was presented to the public in October. The Vesta project (Vehicule Economede Systemes et Technologie Avances--Economical Passenger Car with Advanced Technology and Systems) pursues the goal of developing a compact four-seat car with an "average consumption" of only 3 lit per 100 km which can be made in large series during the 1990's.

The project was tackled early in 1981. Work included investigations of proposals for an improvement of the engine and gear efficiency, reduction in losses due to friction and the need for running secondary power systems as well as ways to improve aerodynamics.

The Vesta is 3,200 mm long (the VW Polo is 3,655 mm long) and is 1,520 mm wide. The engine, which is installed laterally in the front of the car, drives the front wheels. For the model presented, an air resistance coefficient (c_W) of 0.22 was mentioned although the resistance increase due to engine cooling was not taken into consideration. The weight likewise is not yet firm because further investigations are in progress here. The company's engineers expect to attain the goal of 520 kg.

The emphasis in research seems to be on the engine. Work extends to fields such as combustion chamber designs, combustion processes, mixture formation and distribution, reduction of friction losses, and improvement of thermal efficiency by raising the operating temperature.

Fuel Consumption Target

Constant	90 km/hr	2.28	lit/100 km
speed	120 km/hr	3.64	lit/100 km
City driving		3.05	lit/100 km
Thirds mix		2.99	lit/100 km

Research efforts, whose results are to lead to a spectactular consumption reduction, obviously have been making good headway. The calculated consumption for an internal reciprocating combustion engine now under development is below the target given, according to data from Renault.

The Vesta experimental car is a study for large-series auto production during the 1990's. In the thirds mix it is supposed to use less than 3 lit fuel and it is supposed to weigh no more than 520 kg; the VW Polo weighs in at about 700 kg. The extremely small air resistance coefficient (c_W) of 8.22 reportedly helps attain the fuel consumption target.

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BRIEFS

BRITISH LEYLAND ANNOUNCES 'MAESTRO'--Paris, 28 Feb (AFP)--Following the "Metro," British Leyland's "Austin-Rover" group has announced the roll-out on 1 March in Great Britain of the "Maestro," a new 2-compartment hatchback model in the intermediate vehicle class. The Maestro line, which will appear in seven versions powered by 1,300 and 1,600 cc engines, falls into a bracket that represents 60 percent of sales on the British market and will vie directly with the Ford Escort. A 5-door sedan, front-wheel driven by a transversally mounted engine and, unlike the Metro, front-end gearbox, the Maestro will be offered with a choice of four power plant configurations: Standard 1,300 cc, 68 hp, 4-speed transmission; 1,300 cc hle [high-elastic-limit], 64 hp, 3 speeds plus one economy speed; 1.6 liter Series "R", overhead camshaft, 81 hp, 4 speeds; 1.6 liter HLS and MG 1.6 liter, 102 hp, 5 speeds, 177 km/hr. To these six models is added the "Vanden Plas," a deluxe sedan, with 1.6-liter, 81-hp motor, 5-speed transmission and an array of equipment, including a speech synthesizer (with which also the MG is equipped). The Maestro, 4 m or 4.04 m long depending on the model, will appear to the French to be much closer to the Renault 9 (4.06 m) than to the Renault 5 (3.52 m) or the Peugeot 205 (3.70 m). It will stand out because of its width: 1.68 m (Renault 9: 1.65 m), but may appear a bit heavy: 875 to 985 kg, depending on the model, versus 805 to 840 kg for the Renault 9. Economy of operation was given special study: Oil change every 19,320 km, replacement of spark plugs every 68,630 km, "long-life" battery, electronic regulation of idling, etc... The Maestro will not be on the market in France before October 1983. [Text] [Paris AUTO-INDUSTRIES in French 28 Feb 83 pp 2-3] 9238

BRITISH LEYLAND RECEIVES FUNDS--London, 1 Mar (AFP)--The British government has agreed to make available to British Leyland, the nationalized automobile manufacturer, supplementary funding in the amount of 100 million pounds to subsidize the launching of its new models this year, it was announced by Mr Norman Lamont, deputy minister of industry, to the House of Commons on 28 February. The announcement of this measure came on the eve of the launching of the new "Austin Maestro," on which British Leyland is pinning high hopes. The subsidy will be disbursed only if British Leyland specifically requests it and on condition that the enterprise itself also seek private financing of its future funding needs, Mr Lamont said. The government had already granted British Leyland 620 million pounds in 1981 and 370 million in 1982. [Text] [Paris AUTO-INDUSTRIES in French 1 Mar 83 p 2] 9238

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